School Shop

vol. 1 no. 8

May, 1942

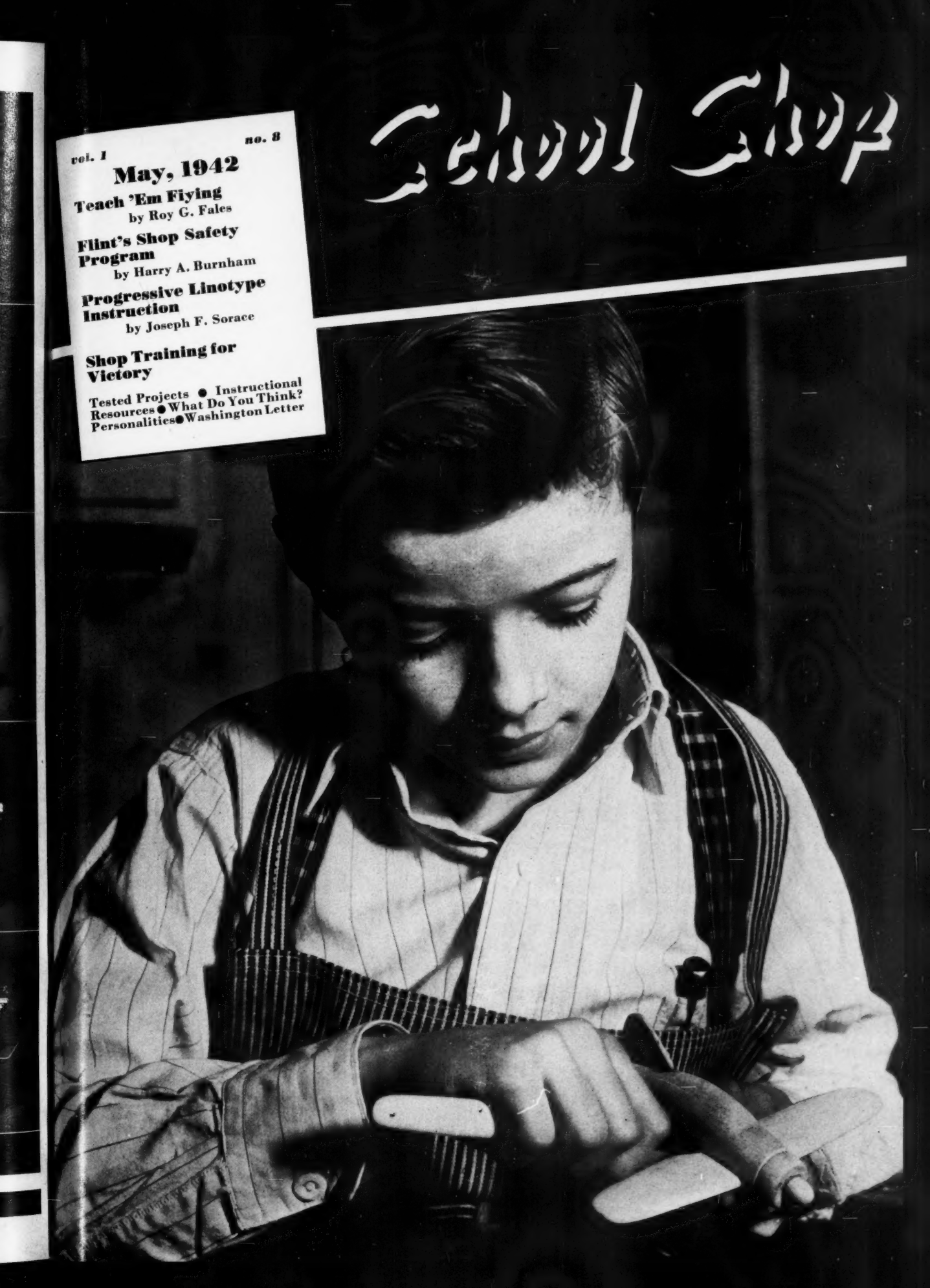
Teach 'Em Flying
by Roy G. Fales

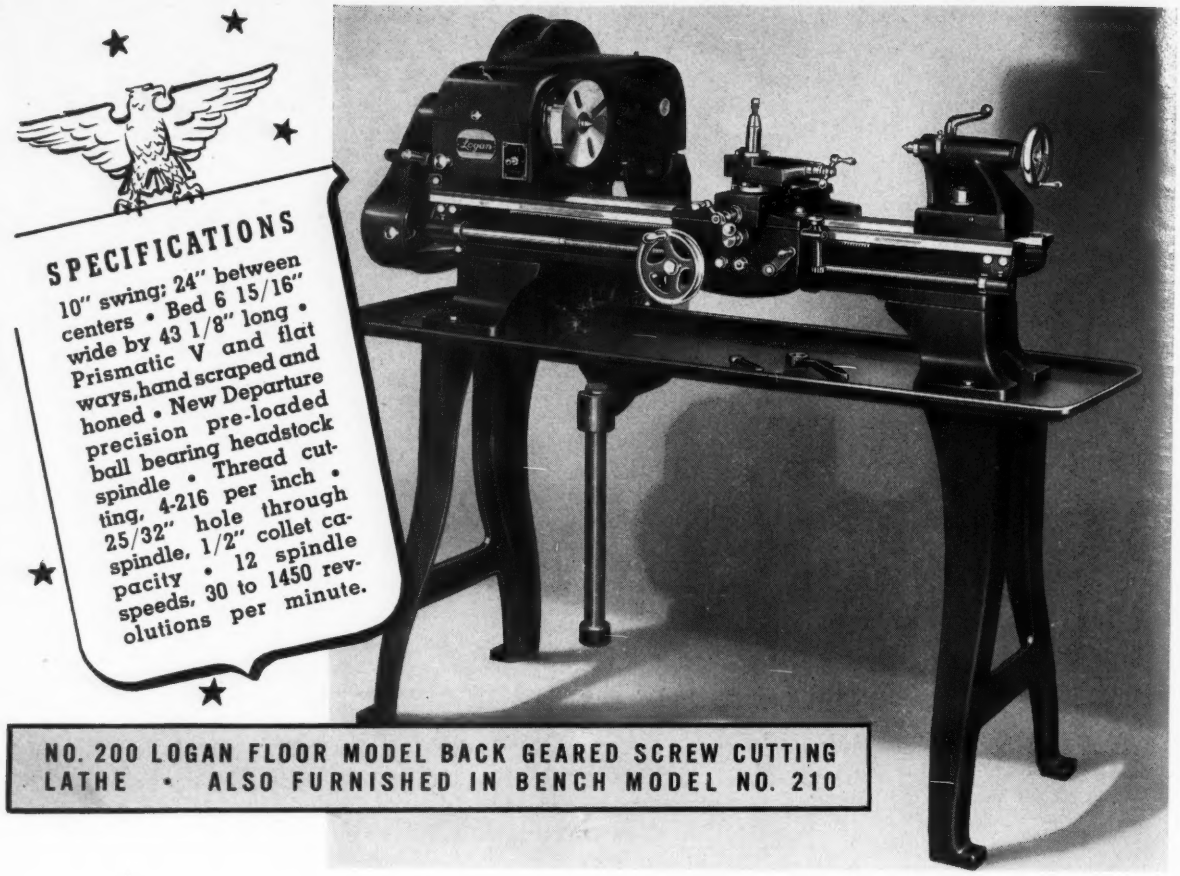
Flint's Shop Safety Program
by Harry A. Burnham

Progressive Linotype Instruction
by Joseph F. Sorace

Shop Training for Victory

Tested Projects ● Instructional Resources ● What Do You Think? Personalities ● Washington Letter





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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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Teach 'Em Flying

by Roy G. Fales

Student testing an experimental plane in the wind tunnel at the Bethlehem Central Rural School at Delmar, New York.

Never before have shop teachers had such a challenge presented as that precipitated by the all-out effort of the United States to achieve air supremacy. Youth are already air-minded but this predisposition must be directed and developed into useful knowledge and skills. Courses in aeronautics, from the elementary school through the technical school, offer industrial education an opportunity to be of real service—both to our country and our youth. Roy G. Fales is Supervisor of Industrial Arts for the New York State Department of Education and director of the development of junior aviation courses in that state.

AVIATION has captured youth! Manufacturers of model airplane kits estimate that they produced more than 20 million model kits during 1941. The National Aeronautic Association, in a bulletin published December 18, 1941, states: "The combined activity (model building) includes some 500 leader members, 12,000 licensed model builders, and 700 affiliated clubs with a combined membership of upward of 250,000." This statement is modest. It is probable that New York state alone has a minimum of 50,000 boys who have made flying model airplanes in conjunction with some of their school work during 1941. Junior aviation, as represented by construction of flying models, has been carried on in the public schools of the state for many years.

This evidence of interest is all to the good, but it is not enough. If this country is to maintain its position as a world power, the youth of the nation must understand the possibilities and limitations of the aviation industry. Airplanes are vital to our very existence. Moreover, after the war is over this country will own thousands of airplanes and have thousands of experienced pilots and maintenance men who will be seeking positions in commercial aviation. Air transportation of freight and passengers will increase tremendously.

Germany and Russia have long trained their youth in aviation through organized instruction and club activities. In adolescence they learned to glide and in early youth were taught parachute jumping and piloting. This activity has given these two countries a tremendous advantage over other countries where such training has not been developed.

In the United States there is a relatively small number of high schools in which boys may study aviation ground work and piloting. Of the approximately 900 high schools in New York state, only seven offer aviation courses as a regular part of the day-school curriculum. In the academic high schools, not more than six courses in aviation are offered at the present time and in none are pupils permitted to fly or work on planes which are to be flown. These are virtually ground courses in the principles of aviation and flying with a relatively small proportion of the time devoted to shop work. Most of the jobs performed are in the nature of exercise work.

One of the commonly accepted objectives for junior and senior high school education is exploration of various occupations. If the junior and senior high schools are to provide an exploratory experience in aviation for their pupils, it will of necessity be some form of junior aviation work which does not involve actual flight. It seems necessary to condition the pupils of today for the kind of life which they will live tomorrow. They should be given experiences with small gliders, flying model airplanes, and ultimately be inducted into adult aviation with a full realization of all that it means to the country. From the work which may be performed in their junior aviation courses, will come a broad understanding of the basic principles of flight and the underlying scientific principles which make safe flight possible. Courses of this kind should be incorporated in all junior and senior high schools for two purposes: (1) so that all boys and girls may obtain a better concept of aviation and its function in our civilization; and (2) so that pupils may begin at an early age to study airplanes and the principles of aviation and flight, as a foundation for adult aviation.

Junior Aviation in Public Schools

Teachers of science, industrial arts, and summer playground supervisors have long known that the construction of flying model airplanes has offered pupils in grades 4 through 12 an intensely interesting experience. Under the guidance of these teachers, public-school pupils have constructed many kinds and sizes of gliders and flying model airplanes. There are roughly seven levels of constructive work for pupils in the public schools. These stages of work may be defined largely by the kind of plane which they may construct. These levels of activity are as follows:

1. **Gliders.**—The simplest form of plane which a pupil may construct is the glider consisting of a flat wing with a stick fuselage. These gliders may be made very easily by children in grades as low as the fourth or fifth, due to the fact that they do not require any great amount of cutting and shaping. These gliders may be flown and in some instances have attained a considerable

flight. They are usually flown from the hand.

2. **Flying Models (A).**—There are two types of flying model airplanes. The first is the stick model which, like the glider, consists of a simple plane or wing connected to the tail by a single stick. These planes are usually driven with a rubber band and are the most easily constructed of all flying model airplanes.

3. **Flying Models (B).**—After pupils have made and flown the simple stick model described above, they are usually anxious to build a cabin plane which will approach in appearance those which they are accustomed to seeing in flight. Like the stick model, these planes are usually powered with a rubber band which is hidden inside of the cabin.

4. **Scale Models.**—Only pupils who do not have patience and an interest in, and understanding of, science are not interested in building flying model planes. Some of these pupils find great satisfaction in the construction of scale-model planes which are replicas of the various army and navy models. These are usually mounted attractively and are most effective when they are exact scale reproductions of full-sized planes.

5. **Gas-Powered Planes.**—Boys who are 15 years of age or older are likely to be interested in the making of large model airplanes with wing spreads varying from 20 inches to 4 or 5 feet. Planes of these sizes are not usually successful in flight unless they are powered with a small gasoline motor. These planes are the most advanced model projects which may be offered to the adolescent pupil.

6. **Gliding.**—Pupils who have successfully constructed and flown gas-powered models, of necessity understand many of the basic principles of flight. The angle of attack, the angle of incident, dihedral, and other terms commonly used in aviation are familiar to them. These pupils have usually reached the age where they may be trained to fly a glider.

This type of work is unjustly considered to be outside of the range of the average academic and vocational high school. Courses involving actual flight are usually postponed until graduation from high school. Gliding might well be taught in many senior high schools.

7. **Flying.**—Actual flying in trainer planes is a type of work which has been commonly postponed until after the age of 18 and seldom has been attempted in high schools. It is very possible that in the near future public senior high schools will come to the realization that it is just as essential to train their pupils to fly airplanes safely as it is to teach them to drive automobiles safely. Certainly, senior high-school authorities, under existing world conditions, have a very definite obligation to society to train the youth of this country in such a manner as to make them air-minded and familiar with the principles and methods of flight.

Probably, actual flight, in trainer planes, should be postponed until after graduation from high school. Such courses are likely to be of a vocational nature and pointed directly toward training for gainful employment.

Opportunities in the Elementary School (Grades 1 to 6).—In many classrooms, in the elementary schools of today, the teachers are already taking advantage of the opportunity to further the normal interest which most children are showing in airplanes. There are many books pertaining to aviation and flying which children may read. Some of the historical background of the development of the airplane can be put in story form and presented to very small children. The very young pupils may make and fly simple model gliders and paper darts. Simple as the paper dart is, it can be used to illustrate many of the basic principles of flight.

In grades four, five, and six pupils are better able to make simple planes than they are in the first three years. Construction work in these years probably will be confined to a club activity rather than being incorporated as a required unit of work in any of these grades. Boys, in particular, at this age are interested in club activities and are able to make considerable individual and collective growth in the understanding of this type of work. Throughout this period books and construction work may be supplemented with the drawing of pictures of airplanes in the art class and the study of some of the geographical routes which have been established by commercial airlines.

This work may be supplemented with a visit to the local airport where planes, the landing runways, beacon lights, maintenance activity, and field lights may be studied first hand.

Classroom teachers will find available for use many books and magazine articles showing pictures and drawings of models which may be constructed. The kits which can be purchased in the 10-cent store are also very helpful in the development of work in these grades. In cases where the classroom teacher is not familiar with the material, methods, and construction work, some assistance can be secured from older boys in the school, members of a local model airplane club or the industrial arts teacher in the school system. As a rule, the industrial arts teacher will be glad to assist classroom teachers in learning how to handle the few simple tools and materials which are needed for this type of work.

Opportunities in the Junior High

Mid-west high-school students constructing wing assemblies for gliders.

School (Grades 7 through 9).—Aims and objectives for junior high school education revolve around two general terms, general education and exploration. Both of these forms of education may be obtained along the lines of industrial and commercial aviation in the industrial arts shop. These shops, as they are usually equipped today, provide facilities with which to begin and carry on the construction of flying model airplanes. The work of these three years in many of the progressive school systems includes a number of activities including many kinds of metal, electrical, wood, printing, textile, and ceramic work. The total number of activities which can be offered in the average school employing one industrial arts teacher approaches 75. Junior aviation work is one of these and because of the present tremendous expansion of the aviation industry is entitled to an unusually strong emphasis. All industrial arts teachers, today, are surely justified in altering their customary program in order to pay increased attention to the construction and flying of planes. Any industrial arts department that does not accept responsibility for the training of junior high-school boys today in some of the basic principles of this work is neglecting its duty.

While unusual emphasis should be placed on aviation in the junior high-school grades at the present time, industrial arts teachers should not sacrifice completely all contact with the other materials and types of industries which are continuing to employ people and produce commodities which are used by all.

A course in junior aviation for the junior high-school grades should consist of the making of gliders, stick models, cabin models, and scale models. In some instances, one or two individuals may show sufficient ability and interest to justify their being allowed to work on gas powered models. For the most part rubber-band powered models and scale models will provide as much difficulty in construction and appreciation of aviation as these pupils can absorb.

Senior High School (Grades 10 through 12).—There are four types of courses which will find their place at the senior high-school level. The pupils of these grades have reached the point where they are ready for courses of increased complexity.

The simplest type of senior high-school course which will be effective will consist of the construction of cabin-model airplanes and scale-model airplanes. All pupils who elect to make projects of these types should be required to produce perfect workmanship. Anything less than this will reduce the work to that of the junior high-school level and fail in its purpose. This course should also include the construction and flight of gas-powered models. In fact, many teachers would be justified in requiring that all pupils enrolled in this elective course make a gas-powered model plane. Construction of this type of plane is the most advanced type of project which can be offered in a class of this kind with satisfaction to the pupil and a justifiable educational content.

The second type of course which might be offered in the senior high school should be designated as a course in designing model airplanes. In this course pupils should be required to develop ideas of their own, planning their planes with an experimental point of view and using precise formulas for the designing of the various parts of the plane. There are books on the market today, which make it possible for senior high-school pupils who have had a course in algebra to design with a reasonably scientific procedure experimental planes of their own conception.

The third type of construction course which might be offered, in the senior high school, would consist of making full-sized gliders. In order to make this course entirely successful pupils should be permitted to fly them. Teachers for this type of work are not now available but the responsibility for the training of present-day industrial arts teachers to construct and fly craft of this type should be placed in the hands of teacher certification agencies.

A fourth type of course which should be offered in the senior high-school will consist of a comprehensive and thorough study of the scientific and basic principles of airplane construction and flight. Such a course would include a study of aids, safeguards, and public regulations; meteorology and its effect on navigation; and aerodynamics and the preliminary information which is needed prior to training for flight in a full-sized plane.

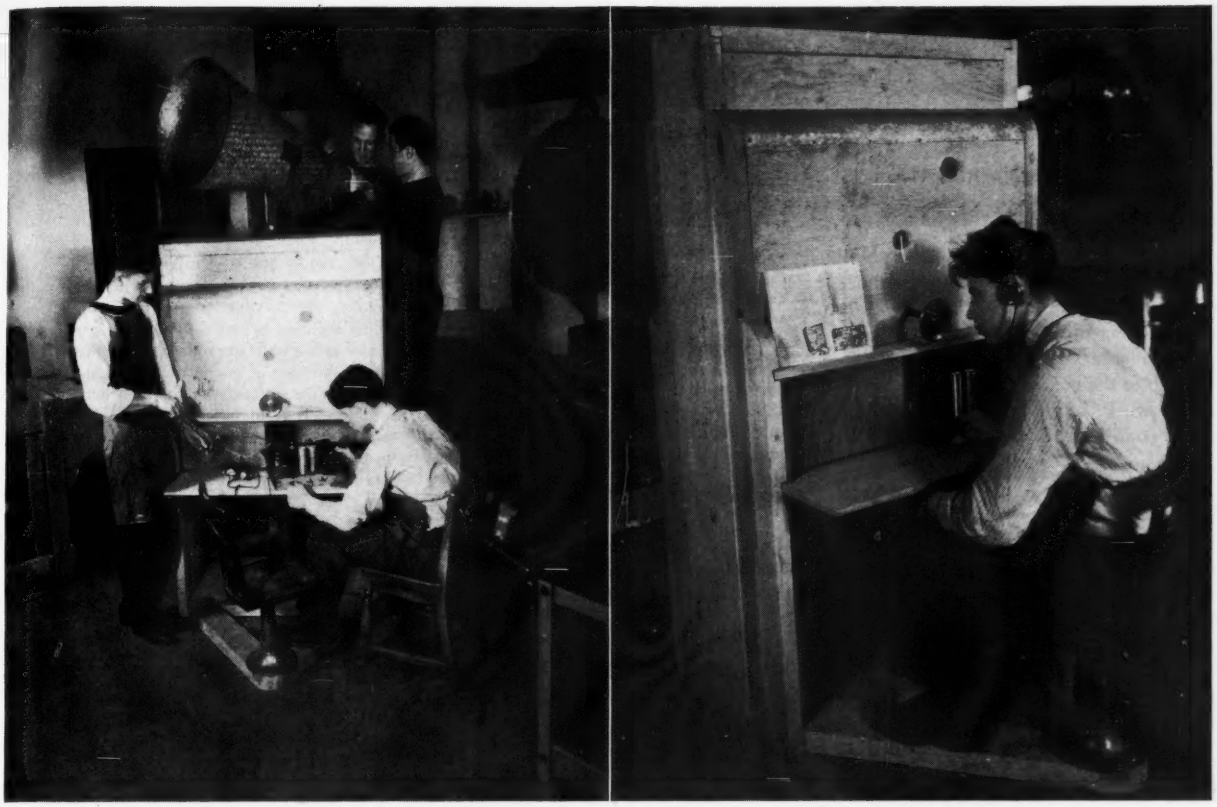
It is possible to combine this type of course with the course in gliding which is described in the preceding section. This combination would reduce the total amount of time which would have to be given to this work.

Shop classes can serve as selective devices to aid in the location of pupils who are so interested in aviation that they may wish to pursue the study of it more extensively than classwork will allow. Club activities at all grade levels are excellent means for fostering this interest.

New York state high-school students working on the model aircraft project for the Navy Bureau of Aeronautics.

Schools Are Prepared

Due to the fact that elementary junior aviation work requires only the use of very simple tools and equipment such as razor blades, glue, pins, and possibly drawing boards it can be conducted in



Left: Constructing an aircraft detector in the school shop at Delmar, New York. Right: Student testing the aircraft detector.

any public school in the country. Schools having industrial arts shops including woodworking equipment are usually best equipped for construction work with the exception of that pertaining to gas motors. Any school which has either a general shop or a general metal working shop is well equipped to permit pupils to construct and assemble gas motors for model planes. In buildings where there is no shop, any vacant room can be equipped with a few light tables or benches composed of saw horses and boards which will meet all the needs of either classes in aviation or club activities. It is even possible to carry on this work in an ordinary classroom providing the desks may be covered with a sheet of heavy paper, cardboard or plywood.

As junior aviation work develops the matter of a place to fly model planes which will not interfere with the general public, becomes a problem. Extended flight of the larger rubber-band powered and gas powered models becomes a serious matter due to the danger that they will strike windows or interfere with the activities of non-interested individuals. The seriousness of the situation has been emphasized by certain restrictions which have been placed on the use of gas powered models by governmental authorities.

Obviously, pupils cannot be expected to make flying model planes which cannot be successfully flown. School gymnasiums, auditoriums, and other large rooms are not always available for use, nor do they permit certain kinds of flight. For the most successful operation of such planes, it is desirable that a flying model airport be provided in every community. Airports may be located in a park, large vacant lot, or on the edge of the city or village. It is probably not advisable to locate a flying model airport too close to a commercial airport because of the danger of model planes interfering with the safe flight of commercial planes.

Teachers Need Training

Industrial arts teachers today may have had a very small amount of experience in the construction and flying of planes, but a large majority of them lack the technical skill and information which is necessary for successful leadership of organized junior aviation classes and clubs. The necessary knowledges and skills can unquestionably be provided in a brief one-week course if teachers are free to devote their entire time to studying, constructing, and flying planes. Unquestionably, a course of this kind could be taught more effectively over a more extended period were it not for the fact that the present national situation demands immediate attention to the study of aviation. Public authorities should take the necessary action to train industrial arts teachers to utilize the special materials required for junior aviation.

Financing a Program

The expense of a local program of construction and flying model airplane work is comparatively slight. Small planes may be built from kits which are obtainable in 5-and-10 cent stores or through jobbing houses. As a rule pupils are expected to provide their own working kits.

In some instances, schools have provided materials in bulk. Balsa planks may be purchased and cut up on the circular saw. In many communities, one or more stores stock sheet balsa and some of the common sizes which are used for wing and fuselage parts. Wire, cement, and paper are comparatively inexpensive. If the pupil provides the materials which he needs, there is virtually no expense up to the time that area contests are provided. These sometimes entail traveling expenses and a limited number of prizes.

In some communities, experience has

shown there are public spirited individuals who find it possible to finance contests and some promotional work. In other communities, local service clubs may be interested in adopting this work as a project in boys' club work or as a problem in preparation for national defense. Many service clubs are on the lookout for activities of this kind.

When the public schools of the country provide the children of all grades with a reasonable contact with aviation and its effect upon society, beginning in the elementary grades and carrying through to the completion of senior high school work, our country will be in a better condition to defend itself nd to solve some of the post-war occupational transportation and passenger travel problems which will be facing the world.

Reading List

Pamphlet Library on Basic Aviation Subjects, Air Youth of America. National Aeronautic Association, 718 Jackson Place, Washington, D.C. 24 pamphlets, 25 cents each.

Youth in Aviation, Air Youth of America. National Aeronautic Association. D. Appleton-Century Co., New York. 1941. $2.50. (An air youth manual for leaders.)

Building and Flying Model Airplanes, Air Youth of America. National Aeronautic Association. D. Appleton-Century Co., New York. 1941. $2. (A book for boys.)

Model Airplane Contests, Air Youth of America. National Aeronautic Association. D. Appleton-Century Co., New York. 1940. $1.25. (Kinds and organizations of contests.)

Winter, William. *Model Aircraft Handbook.* Crowell, New York. 1941. $2. (A comprehensive construction book for boys.)

Pope, Francis, and Otis, Arthur S. *Elements of Aeronautics.* World Book Co., Yonkers-on-Hudson. 1941. $3.40. (A ground course in flying for senior high school.)

Grant, Charles Hampson. *Model Airplane Design and Theory of Flight.* Jay, New York. 1941. $3.75. (Mathematical and scientific designing of model aircraft for use in senior high schools.)

Model Airplane News (Magazine), Jay Publishing Co., New York, 20 cents a copy.

This list is not conclusive. There are many books on the market dealing with these subjects as well as other phases of aviation from model building to actual flying of power planes. Books and booklets are also published showing a great number of model plane designs.

Additional information on instructional resources for aeronautics courses may be obtained at public libraries, at stores selling model kits, and from Air Youth of America division of the National Aeronautic Association, Washington, D.C.

A Junior Course in Aeronautics

Illustrating perfectly one method of meeting the need outlined in the preceding article by Roy G. Fales, this course of study has been a success in the Silver Creek, N.Y., High School and is taught by Michael F. Blawat.

by **Michael F. Blawat**

THE present demand to make the United States the supreme air power of the world should be evidenced by a response from every classroom. Industrial arts teachers particularly are in an advantageous position to help achieve this goal. A junior course in aeronautics is one method.

The following course is being successfully used in a small school where only one course can be offered which has to be difficult enough to satisfy the advanced students, yet elementary enough to appeal to beginners.

The course is open to all high-school people interested in aeronautics and model airplane building.

The following work is covered:

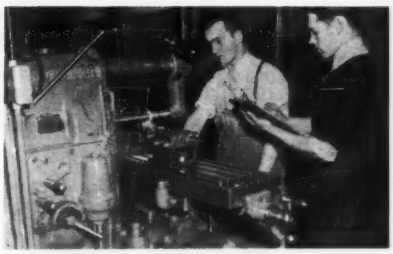
Projects and Activities

One glider—Air Youth of America model.
One R.O.G. flying stick model—flat or cambered wing—AYA No. 2 or 3.
One fuselage model—AYA No. 4.
Work on gas model.
Work to completion on one of the following:
  airport model
  wind tunnel
  flight testing machine.
Visit to a commercial airport.
Take part in a local model contest.
Compete in the county model contest.
Contribute to historical posters of airplanes.
Make a notebook with the following contents:

1. History of Aviation
   a) Early developmental history (Leonardo da Vinci — 1490 to Wright Brothers—1909)
   b) The modern era of flight (1909 to 1942)
   c) Types of planes (triplane, biplane, monoplane, autogiro, helicopter, commercial, military, and small private planes).
   d) Colored pictures of each of the above.
2. Parts of an airplane
   a) Wing forms—their construction and function
   b) Tail assembly and functions
   c) Fuselage constructions and their functions
   d) Power plants used today.
3. Science
   a) Why an airplane flies
   b) Forces on a plane in flight
   c) Gasses and air currents
   d) Streamlining and its use and application in modern transportation
   e) Navigation, consisting of how to plan a route from one place to another and how to arrive at the destination by means of calculations and observations, problems of water and air navigation
   f) Meteorology, to consist of a study of the weather instruments and how the pilot applies his findings in planning routes and flying
   g) Method of control
4. English or Nomenclature
   a) Glossary of terms
5. Guidance
   a) Types of jobs in the aviation field —15 or more
   b) Educational requirements in avition occupations
   c) Schools offering courses and preparations for above occupations
   d) Government aviation schools, requirements and training received
   e) Other ways of getting the education and the experience necessary for the above occupations
   f) A career in the kind of work, in aviation, that interests me
   g) Aircraft factory employment
   h) What I will do or what I would do to fit myself for this work

Shop Safety Program in the Flint Schools

BY *Harry A. Burnham,* DIRECTOR OF VOCATIONAL EDUCATION, FLINT, MICHIGAN, SCHOOLS



THE Flint Public Schools have been using a safety education plan in their shops that gives the pupils an opportunity to function in the same manner as the man in charge of safety education in an industrial plant. Each shop instructor appoints one of his most alert boys to act as safety foreman for one semester. Since the safety foreman holds a most responsible position in the school shop, the boy selected should be interested in safety and be willing and able to accept responsibility. The safety foreman is expected to know all safety rules and be able to point out infractions of rules to others. He consults with the instructor each Friday and recommends a new safety engineer for the following week's work.

The safety engineer serves one week, thus making it possible for each boy in the class to have at least one week as acting safety engineer. The safety foreman is responsible for the weekly safety engineer, checking to see that he does his job.

The check sheet shown was developed by a committee of shop teachers with a view to simplifying and standardizing the job of the engineer. In view of the varying conditions in each type of shop, it will be obvious that a different check sheet will be needed for each shop.

In case of an accident, the safety engineer and his foreman report immediately to the instructor so that proper first aid can be given. If the accident is of a serious nature, and the attention of a doctor is needed, the instructor notifies the principal, who in turn calls the family for the name of the family doctor, where the boy is then taken. In case of emergency, he is taken to any doctor.

The safety engineer, with the aid of the safety foreman, must then report in the space provided the names of those involved in the accident, the witnesses, and to the best of his knowledge, what caused the accident.

With an enrollment in the Flint school shops for the school year 1940-41 of over 6000 students, only 15 minor accidents were reported. This record gives satisfaction to both teachers and administration, especially when compared to that of a few years before.

The advantages of this type of safety system in the school shops are:

1. The instructor can usually select a capable boy to act as safety foreman. This boy can be the guiding hand of the safety organization, and still carry on his regular classroom work.

2. The instructor is sure to have at least one person looking after safety in the shop at all times, and if the safety engineer proves satisfactory, at least two persons besides the instructor are checking on safety.

3. There is action in this type of safety education because each boy actually gets a chance to be a safety engineer and to check machines and workers for correct safety procedure. He has this job for a week and when he returns to his job, he is safety conscious.

4. The safety engineer is given a safety check sheet to work from, so he knows what his duties are. He also knows that the instructor and safety foreman are checking on him, and his grade for the week depends on the type of job he does.

5. The instructor can release a safety foreman at any time that the boy does not prove satisfactory. This is understood by the boy when he takes the job. It is an important job and must be handled with extreme care.

6. Safety is being taught on the job and not as a separate subject.

WOODWORK SHOP
SAFETY ENGINEER'S CHECK SHEET

Engineer's Name_____ Date_____
Week No._____ Hour_____

Check at beginning of period to make sure all machines are in working order. Be ALERT and ATTENTIVE during entire period for any breach of Safety practices. BE ON THE JOB AND HELP PREVENT ACCIDENTS.

Note: This form is to be filled out each day.

CHECK THESE SAFETY FACTORS	Mon.	Tues.	Wed.	Thur.	Fri.
Sleeves and aprons proper					
Grinder tool rest 1/8" from stone					
Hammer handles securely fastened					
All cans of woodfinishing materials capped					
Stock rack in order					
All machine guards in working order					
All coats or sweaters removed					
Tables of machines always clear of scraps					
Only operator of machine inside of red lines					
No loose handles on wood lathe tools					
Pusher sticks for machines in place					
Guard on jointer never pulled away from knives					
Jointer fence never pulled over table while machine is running					
No scraps on floor in front of machines					
Turn off any machine making unnatural noise					
Watch for abuse of tools or machines					
Boards less than 10" not to be run on jointer					
No crowding around machines					
Comments:_____					

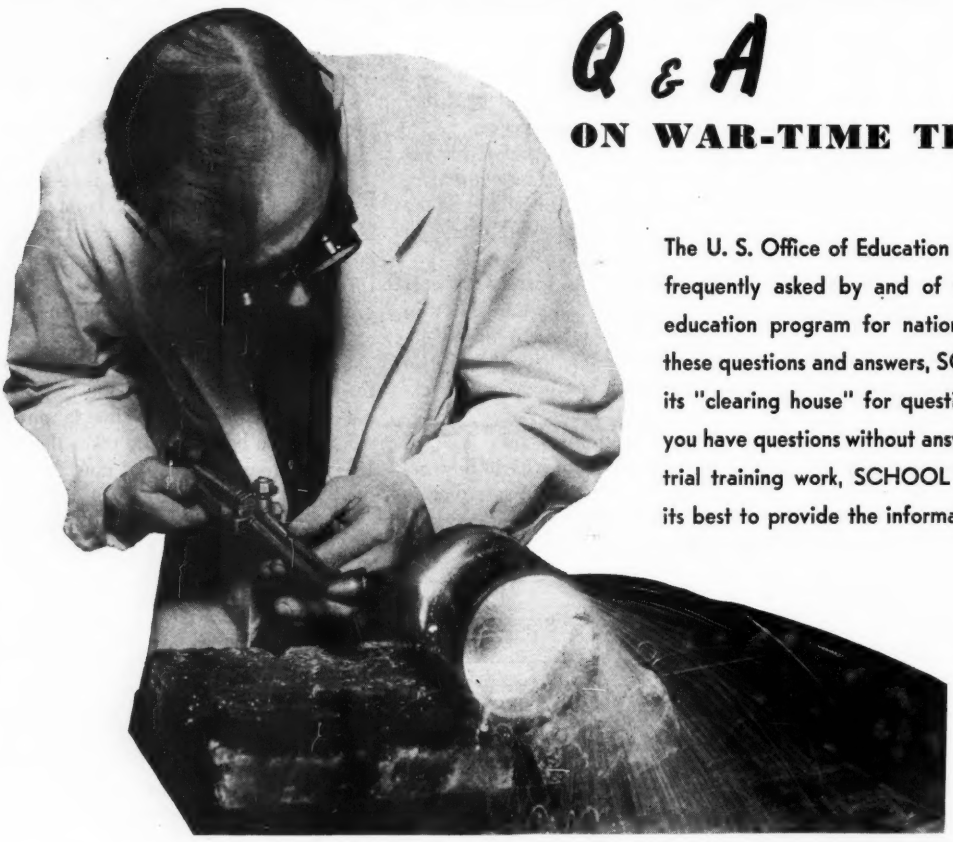
ACCIDENT REPORT

Name_____ Nature of Accident_____
Cause_____
First Aid Given_____
Witness_____

Signatures:
Injured_____
Student Safety Engineer_____

SHOP TRAINING FOR VICTORY

A monthly department devoted to items of interest concerning defense-training classes



Q & A
ON WAR-TIME TRAINING

The U. S. Office of Education answers the questions most frequently asked by and of teachers in the vocational education program for national defense. In presenting these questions and answers, SCHOOL SHOP inaugurates its "clearing house" for questions of a similar nature—if you have questions without answers in your war-time industrial training work, SCHOOL SHOP will be glad to do its best to provide the information you need.

Trainee in acetylene welding, national defense program, Boys Vocational School, Baltimore, Md.

Q. Who is eligible for defense training?

A. Persons are eligible for preemployment, refresher, and conversion types of training who possess qualifications which, upon completion of their training, are likely to assure them employment in war industries. Persons are eligible for supplementary training who are already employed in occupations essential to national defense. Persons who are 17 years old and not more than 25 years old are eligible for training in out-of-school youth preparatory courses.

Q. Are jobs assured those who complete training?

A. No. Since training, however, is geared to labor requirements of defense contractors, a large percentage of trainees who successfully complete training are placed in suitable jobs. Persons seeking employment are registered with the U. S. Employment Service.

Q. Who selects persons for preemployment or preparatory training?

A. Persons who are registered with the U. S. Employment Service and who appear qualified are preselected by that agency for referral to the public vocational schools for final selection by school authorities.

Q. How are occupations selected for which training is given?

A. The War Production Board determines those occupations which may be approved for vocational training courses for defense workers. In each state and in each local community there are organized advisory councils and councils of administrators. Advisory councils consist of equal representation of employers and employees, and recommend to the council of administrators (representatives of vocational schools, employment service, and NYA) the training needed and the number to be trained. Regional labor supply committees determine the need for defense workers on regional levels.

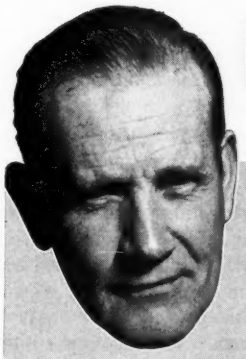
Q. What is the relationship of vocational training for defense workers to other federal agencies?

A. The defense-training program of the public schools is a fractional part of the whole training program for war industry. In the total program there are other agencies involved. The training-within-industry program of the War Production Board promotes on-the-job training by defense plants; the U. S. Department of Labor develops standards of apprenticeship training through the Federal Committee on Apprenticeship; and the National Youth Administration and the Civilian Conservation Corps provide work experience for enrolees in special national-defense centers. The U. S. Office of Education cooperates with state boards for vocational education in the educational phases of all of these programs.

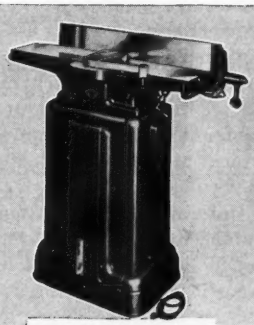
Q. Are persons on WPA eligible for training?

A. Yes. Employees of WPA are referred to the public schools by their project supervisors when they appear to have aptitudes or work experience which make vocational training advisable.

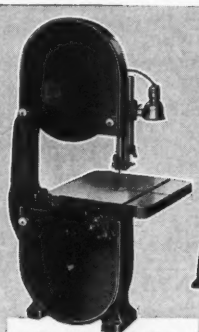
"These Low-Cost Machines help my training program"...



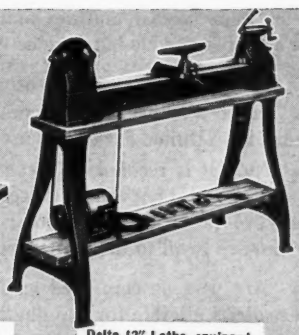
Delta 14" Drill Press—has numerous special features. A full line of 17" models also available



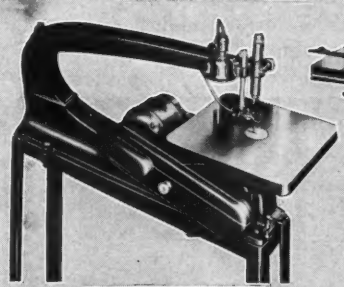
Delta 6" Jointer Unit—a compact, well guarded unit with dual-control handle, patented fence and other special features



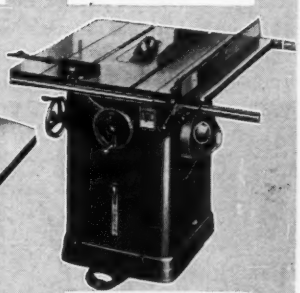
Delta 14" Band Saw—sealed-for-life ball bearings, tilting table. In both wood and metal-cutting models



Delta 12" Lathe, equipped with sealed-for-life bearings, self-indexing headstock—ideal for school shops



Delta 24" Scroll Saw—Revolutionized modern scroll saw design. Offers minimum vibration and blade breakage



Delta 10" Tilting Arbor Circular Saw—has many exclusive features

An industrial training executive said recently: "I have found that Delta low-cost high-quality machine tools have definitely helped solve some of our problems in vocational training. We have found that Delta machines have been widely adopted by industry on an astonishing scale—so that by using Delta machines in our school, we can now train students on the same machines they will use in industry. And—on a price basis—we can equip one of our shops for almost 70% less money by using Delta machines instead of heavy mill-type machinery—or to put it another way, we can purchase equipment to train nearly three times as many students for the same investment.

For these reasons we have adopted Delta machines for vocational training in connection with the war production program. . . ."

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Q. Are women eligible for training?

A. Yes. As specific need for additional persons in war industries developed, women have been given training in suitable occupations.

Q. How are trainees placed in jobs in war industry?

A. Local offices of the U. S. Employment Service are generally responsible for placement of persons in jobs in war industries. Persons are usually referred to employers following training on the basis of their special abilities and the needs of industries having various types of war contracts.

Q. Must prospective trainees be citizens of the United States?

A. No. It is recognized that many persons who do not have citizenship papers are nevertheless patriotic persons who are loyal to the United States.

Q. Are persons employed on NYA work projects eligible for training?

A. Yes. Employees of NYA work projects may be given vocational training related to their project employment. The public vocational schools in the communities in which NYA work projects are located conduct the training for NYA employees.

Q. How can an individual become an apprentice?

A. An individual becomes an apprentice when he enters a training program consisting of work experience on the job and supplementary related training, through prescribed courses, which will qualify him to intelligently perform the various jobs which the skilled worker in the occupation to which he is apprenticed is normally assigned to do. Initial entrance to apprenticeship is usually through written agreements established by contacting an employer of apprentices, by contacting a labor organization maintaining apprentice agreements, or through state and local apprenticeship councils.

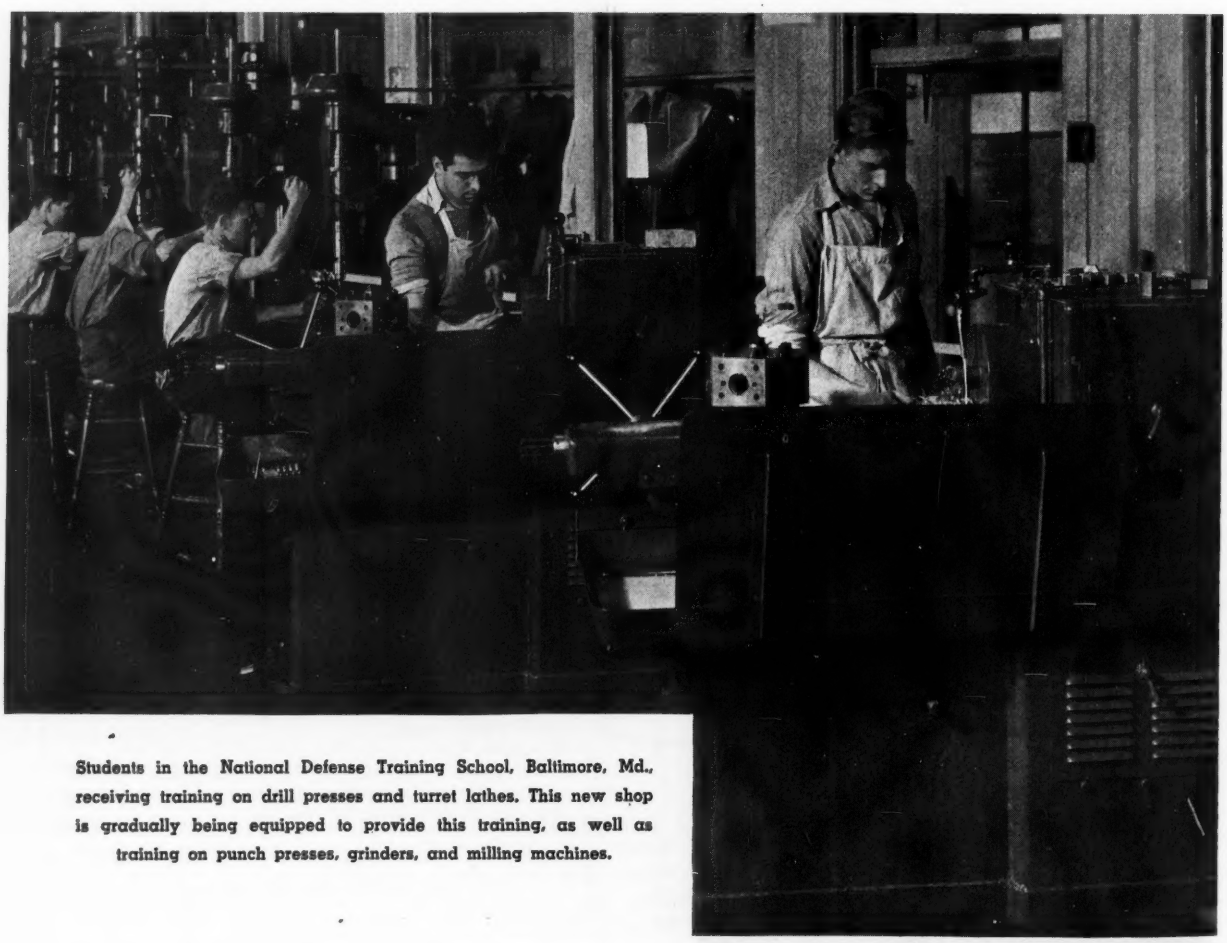
Additional information concerning vocational training for defense workers may be obtained by writing to state directors of vocational training for defense workers, by applying direct to local branches of the U. S. Employment Service and to local public schools, or by writing to the Director, Vocational Training for Defense Workers, U. S. Office of Education, Washington, D.C.

WPB States Policy on Training of Women

The Labor Division of the War Production Board has issued a policy regarding the training of women which makes clear that women will be able to take their place in industry as required, after training in the national defense training program. The policy, as recently announced to state directors of vocational education and to federal agencies, reads:

"In view of the increasing shortages of male workers and the increasing demand for the employment of women throughout the country and in a wide range of occupations, the Labor Division of the WPB has announced the policy that the employment of women shall be facilitated to meet the needs of the war program. This necessitates the extension of defense training to women on a basis of equality with the training of men.

"In referring women to defense-training courses the same policies that govern the referral of men should be followed; that is, they should be selected on the basis of qualification for the occupations in which training is offered, due consideration being given to the physical re-



Students in the National Defense Training School, Baltimore, Md., receiving training on drill presses and turret lathes. This new shop is gradually being equipped to provide this training, as well as training on punch presses, grinders, and milling machines.

quirements of the occupations."

Plans for the training of women for sheet-metal work in the aircraft industry have gone forward in the state of Washington. When vacancies occur in present metal training courses, women are to be placed side by side with men to learn the fundamentals of riveting and bucking. It is expected that the women will be put to work in Washington's aircraft industry upon completion of the six-week training course. The present plan is experimental, says H. G. Halstead, State Director of Vocational Training, who pointed out that the number of women trained will depend on the requirements of the aircraft industry in the near future.

Michigan, too, plans on training women workers in increasing numbers. Having already noticed an increase in the enrolment of women in war-time training courses, the Michigan Board for Control of Vocational Education has issued a bulletin concerning safety precautions and suggestions pertinent to the presence of women in shops. Some of the suggestions are:

Women should wear slacks or coveralls when working on machines.

Women should wear caps, or cover their hair so that it cannot be caught in belts, wheels, pulleys, etc.

Women should wear blouses with short sleeves and high necks, closed at the neck. Loose scarfs and ties should be banned.

Rings, wrist watches, and dangling jewelry should be removed by women workers before entering the training shop.

High-heeled shoes are a tripping hazard and should not be allowed. Toeless shoes should also be prohibited because of the danger from hot metal, etc.

Scrap Disposal Procedure Outlined

The War Production Board has established procedures whereby necessary supplies of welding electrodes and steel plate may be obtained for defense-training courses. Owing to the shortage of steel and iron, the following regulations of the WPB should be accurately followed in accounting for all iron and steel scrap.

Books and teaching aids are invaluable in speeding up your defense-training classes. Latest defense-training publications are described in the Instructional Resources department on page 23 of this issue of SCHOOL SHOP.

1. Iron and steel scrap should be isolated and periodically disposed of.

2. Scrap shall be sold to dealers and checks for the proper amount made out to the state board of vocational education.

3. Records should be maintained accurately of every bit of scrap sold, including name of dealer, quantities, prices, and date of transaction.

4. Any vocational training program producing more than 20 gross tons of scrap in any one month is required to report to the WPB. Suggestions for submitting such reports may be had from the state board of vocational education.

Regular Enrolments Continue to Increase

Total enrolment for 1941 in all "regular" programs of federally-aided trade and industrial education showed an increase of about 5 percent over the preceding year, according to reports received from states by the U. S. Office of Education.

The 1941 "regular" program enrolled 795,725 students, as compared with an enrolment of 758,409 for 1940. This increase continues the upward trend in growth of these classes since 1934. Only classes experiencing a slight drop were the general continuation classes. It is expected that many students who might otherwise have attended these classes failed to do so because of enrolment in

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by Norman J. Clark and Howard E. Corbitt (184 pp., 120 illus.) $2.50

AIR PILOTING—A Manual of Flight Instruction
by Virgil Simmons (680 pp., 160 illus.) $4.00

WEATHER GUIDE FOR AIR PILOTS
by Elbert Lee Eaton (74 pp., 27 illus.) $2.00

GENERAL AERONAUTICS
by Hilton F. Lusk (524 pp., 242 illus.) $3.75

Write for detailed information. Examination copies available to teachers of above courses and to supervisors.

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some phase of the defense-training program.

Indications are that while the defense program has attracted some enrollees from the regular program, added interest in the trade and industrial field, due to employment opportunities, has made up the losses.

Navy Starts Teacher-Training Center

The Navy Department is now training instructors for Navy aviation service in its teacher-training school in Chicago. Housed at the Chicago Vocational School, the training program is now in its third month.

Three hundred instructors are now in training at the school, 100 having entered at the beginning of each month. These men, upon completion of the three-month course, will be sent to all parts of the country to train enlisted men as aviation metalsmiths and machinists' mates. Trainees in the instructor course are qualified under civil service and are paid from the time they enter training.

In charge of the school, which is staffed largely from the Chicago school system, is H. H. Coxen, of Kansas City. Assisting in setting up the training program were Felix E. Averill, special agent, industrial teacher training, of the U. S. Office of Education and Lt. Comdr. D. J. Brim, Jr., of the Navy Bureau of Aeronautics, in charge of naval aviation service schools. Lt. Comdr. E. L. Carlson is in charge of the program.

Further evidence of the expansion of teacher training in the Navy is the establishment of a second course for civilian naval instructors. Averill and J. B. Yingling, of the Office of Education, are beginning this new program in Chicago. The course will open with an enrollment of about 70 instructors, who will, upon completion of the courses, teach aviation cadets meteorology, navigation, and other subjects at Navy reserve bases.

Additional funds to the amount of 10 million dollars have been appropriated for "the acquisition by purchase, rental, gift, or otherwise" of new and used equipment needed by agencies training workers for war-time industries, according to an act just passed by Congress and approved by President Roosevelt. This appropriation is available through June 30, 1943, and is in addition to the 28 million dollars allotted to date by Congress for such equipment.

All-Out Training in Major Occupations

The U. S. Office of Education has authorized training agencies to extend their training programs to the limit of present equipment and facilities, *regardless of known needs,* in four major occupational fields important to the war effort. Extension of courses in this manner must be with the knowledge of the U. S. Employment Service, and all trainees in the program must be informed that there are no local jobs available. The Employment Service will provide information on job opportunities in other communities.

The four fields in which this training may be given are:

Machine tool operation—training should be on a specific machine and of a specific character for specific jobs which are known to exist in other localities.

Arc welders—training should be to develop skills necessary to pass the maritime or Navy welding test. Arc welders of 200 amperes or greater must be available for this type of training.

Riveters, sheetmetal workers—training for specific jobs known to be open in other localities.

Aircraft mechanics—(engine mechanics, instrument repair, radio repair, electrical). Training should be for specific civil service jobs available.

Suggested Courses

for

National Defense Training

Prepared by the Bureau of Industrial and Technical Education of the New York State Educational Department in cooperation with United States Office of Education, The Federal Security Agency, Washington. D.C.

Machine Shop Series — Aircraft Series
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watch for the June *SCHOOL SHOP!*

NATIONAL Defense teachers—SCHOOL SHOP'S June issue is for **you!** This big "Shop Training for Victory" issue will be packed from cover to cover with articles and projects to help you train the workers so badly needed in the war industries. **Watch for these features . . .**

1. Practical articles by leaders of industry and vocational education.
2. **Instructional Resources, News from Industry, Washington Letter**—all devoted to "shop training for victory."
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1. **"Coupon Service"**—a directory of supplies, equipment, and books you need in **your** defense-training classes.
5. Announcements from the nation's foremost suppliers of school shop equipment and supplies.

On **your** desk June 1. Watch for it, read it, **use** it!

SCHOOL SHOP's
"Shop Training for Victory" issue!

Progressive Linotype Instruction

at ROCHESTER A & M

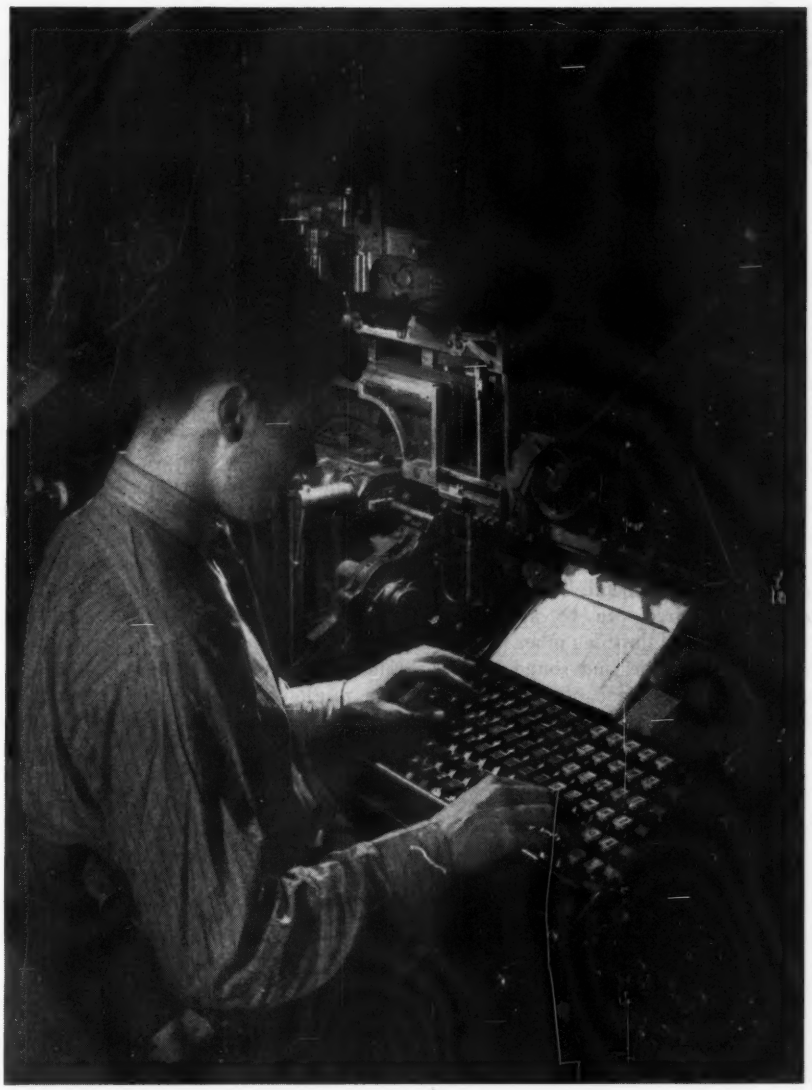
BY *Joseph F. Sorace,* INSTRUCTOR OF PRINTING

IN training students in linotype-intertype composition and maintenance, emphasis at Rochester Athenaeum and Mechanics Institute is placed on vocational training—which is divided into three stages: initial, elementary, and skill-development.

The entire course embraces two years, including related instruction in presswork, hand composition, design and layout, estimating, English, and business administration. The machine operation training is given in instructional units of six hours per week for first-year students and 12 hours per week in the second year. All instruction is in the laboratory, where the student receives training by observation, performance, and exercise of his creative ability.

To begin, the student is allowed six hours to memorize the keyboard layout. He is then assigned to a machine keyboard where he practices fingering and word exercises from an established system of keyboard operation. This system is grouped into seven lessons, manipulating different combinations for finger dexterity and mental agility. Also stressed is proper posture while operating the machine. No matrices are used at this step; the student merely gets the "feel" of the keyboard and orientates himself to the machine. This is the *initial* assignment.

The *elementary* assignment proceeds to operation of the machine with the use of matrices and spacebands; no metal is used. Fingering exercises are similar to those of the *initial* step. This stage usually requires from 24 to 36 unit hours, depending on the student's aptitude. The *development of skill* proceeds from this point. The plunger-pin is in place and the student casts actual lines. He starts at first with finger exercises, and at the end of about 24 hours, begins to develop skill in the setting of straight matter. He takes a proof of all type set, and record of speed and accuracy is kept. Posture at the machine is emphasized at all times during the course.



Excellent and well-rounded experience is provided the students, since they have at their disposal 14 machines: 10 linotypes in four different models, and four intertypes in as many different models. Four machines are mixers; four are equipped with automatic quadders; two with Mohr saws and six-mold disks. Coupled with instruction in keyboard operation is elementary machine maintenance. Since classes are held down to from 8 to 16 pupils, each gets an excellent chance to work on a variety of machines and encounter numerous operating and routine maintenance problems.

The pupil is taught to keep his machine clean at all times; to change liners, ejector blades, magazines; to replace worn parts when needed; to check bolts and screw adjustments at 12-hour intervals; to clean molds, matrices, cams, triggers, spacebands, and other mechanisms. He is also shown how to make the various machine adjustments and how to keep clutch, assembler, and transfer slides in perfect condition.

One class hour per week is devoted to class discussion of mechanics of machine composition and maintenance, in addition to oral assignments of 25 common words for syllabification and definition.

This latter part of the instruction is particularly important, since it is important that the linotype operator be able to read, write, divide, and "juggle" words to convey thought and expression.

Project of the Month:

Strap Metal *Tie-Racks*

and their finishes BY *Einar E. Siro*

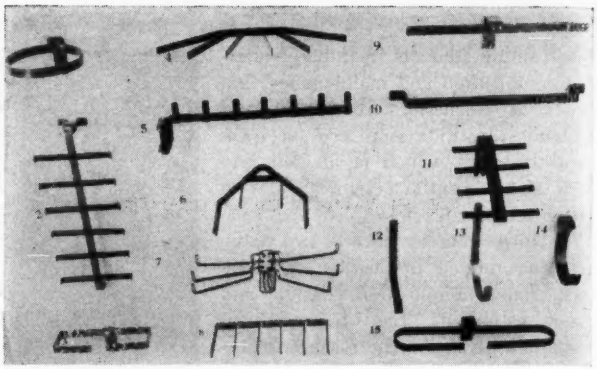


Fig. 1—Fifteen strap metal tie-racks, with 15 different finishes. Fig. 2 shows detail of construction, and bill of materials shows sizes. Racks 2, 5, and 7 swing out from wall.

An interesting series of tie racks and a comprehensive treatment of strap metal finishes especially valuable to both student and instructor, and as a guide and a basis for discussion in metal and finishing classes in teacher-training institutions. The author formerly taught at the Folwell School, Minneapolis, but now is at Fort Knox, Kentucky.

THESE tie racks were designed for a twofold purpose; first, to furnish simple and interesting projects for the beginning students in metal work; and second, as a medium through which the students can be oriented to the common methods of finishing strap metal. The skills and technics acquired can be applied in constructing and finishing other projects made of strap, bar, and round iron as well as projects made of sheet metals including copper, brass, pewter, black and galvanized iron. Some of the finishes can also be used on wood.

The construction of the tie racks is self-explanatory. See the labeled picture in Figure 1, the corresponding labeled detailed drawing in Figure 2, and the list giving the sizes of the materials used in constructing each rack.

The student will find it advantageous to make a full-size drawing of the project and to write a plan of procedure before starting the job. The drawing and the plan of procedure should be checked by the instructor. A satisfactory method of drawing a tie rack full size is to mark off a sheet of paper into one-inch squares and use the drawings in Figure 2 for a guide or draw one of an original design. While making the rack the student can lay his work on the full-size drawing to check the shape and size. Rivets are used for assembling, but nails cut to the proper length can be substituted.

Projects made of strap metal should be finished in some way to protect the surface from tarnish, oxidation, or corrosion and to give the projects a more pleasing appearance. The interest of the boys is enhanced if they are able to finish their projects attractively.

The fundamental secret in applying any finish satisfactorily to a metallic surface is to have the surface thoroughly clean. It must be free from oil, dirt, and loose scales and oxides. Oil can be removed by a solvent such as alcohol or turpentine. The roughness, dirt, loose scales, and oxides can be removed from the metal by the use of a buffing wheel, file, sandpaper, emery cloth.

An opaque finish can be applied to the metal by coating it with paint, enamel, or colored lacquer. Colored lacquer, however, is not recommended for use by beginning students as it dries rapidly and is hard to brush on smoothly. Enamels and paints produce commendable results with beginners. They dry slowly compared with lacquers giving the novice time to brush the surface over again to avoid runs or sags and thus obtain a smooth finish. *Rack 1* is finished with green enamel and *Rack 2* with two different colored enamels, red and blue. An opaque finish of one color can be had by dipping the project into the paint container; this of course is not practical in most cases when one considers the size of the project and the size of the paint container needed. Boys like bright colors, so it is advisable to use them whenever possible; but regardless of the kind of finish the rack should harmonize with the color scheme of the room in which it is to be used.

A novel finish is easily obtained by applying one or more different opaque colors to an opaque surface with a sponge. *Rack 3* is finished with white sponge markings on a blue base, and *Rack 4* with red and black markings on a green base. The project is first given a coat of enamel and allowed to dry thoroughly. On a piece of glass, sheet metal, or heavy paper a small area is painted with the enamel that is to be sponged. A piece of ordinary sponge approximately two inches in diameter is used. A flat surface of the sponge is pressed to the fresh enamel and then touched lightly on the surface to be finished, thereby leaving the irregular imprint of the sponge. One should avoid the appearance of a set pattern or pressing the sponge twice on the same place. To insure clear imprints or figures the sponge is pressed alternately to the fresh enamel and the project. When more than one color is to be sponged on, it is advisable to allow the first sponge work to dry before applying a second color.

An interesting effect can be produced by sprinkling with a small fine-haired brush or by blowing bronzing powders out of a paper trough onto an enameled or painted surface after the paint or enamel has been allowed to set for a few minutes. A special powder blower (or atomizer) can be used if desired. *Rack 5* is finished with black enamel and gold bronzing powder. More than one color of powder can be used on the same project. The surface can be made more durable by covering it with a coat of shellac or varnish. Transparent finishes can also be decorated with bronzing powders. Bronzing powders can be purchased in numerous colors in small quantities in five-and-ten-cent stores, or in hardware and paint shops.

It seems advisable to mention as a precaution that very few lacquers, clear or colored, can be used successfully over a varnished, enameled, or painted surface without first applyng a special sealer or a coat of shellac as the solvent in most lacquers reacts like a varnish and paint remover. In using ordinary shellac it should be kept in mind that it tends to turn gray when used as a final coat where it will come in contact with moisture.

A marbeled finish is obtained by dipping an opaque finished rack into a container of water on the surface of which are floating two or more different colored enamels. The enamels on the

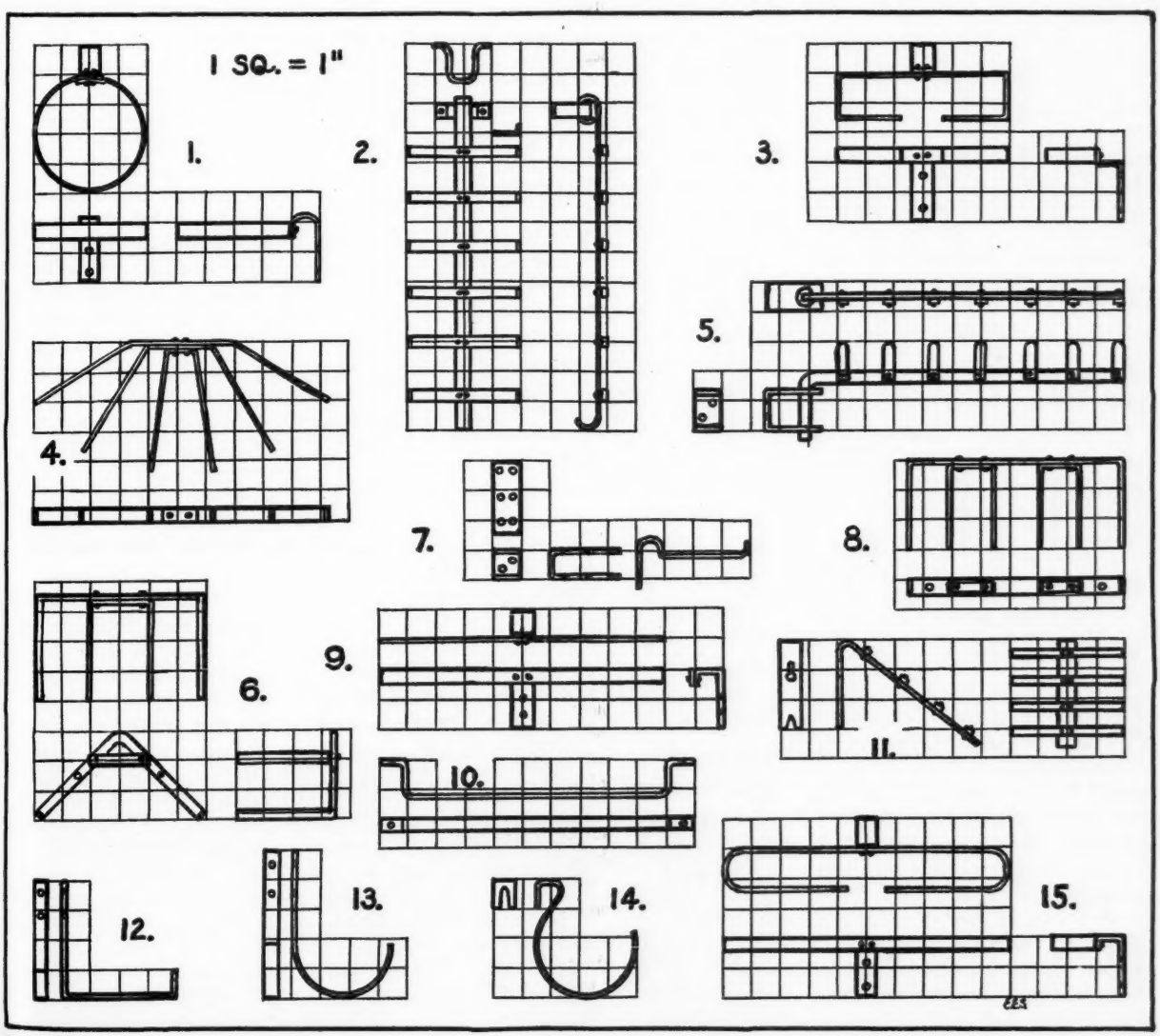
surface adhere to the rack when it is immersed. *Rack 6* is an example of this finish using a green base, and blue and red figures. The drops of enamel are placed on the water with the enamel stirring rod, being careful not to drop them or the enamel will sink to the bottom. The water is then stirred with a piece of wire, stick, or mixed by blowing until a pleasing effect is produced. The rack, which must be perfectly dry, is immersed in the water and at the same time twisted from side to side to help produce a more varied design. It is immediately removed from the water and put away to dry.

Gold or silver bronze paint is a good finish. *Rack 7* is finished with silver bronze paint. *Rack 8* is given an antique appearance by finishing it with silver bronze paint and sponging on black enamel while the bronze paint is still fresh. The black enamel and silver bronze blend together to produce the antique effect. It is advisable to apply a coat of varnish over the bronze paint as some of the bronze flakes may work loose and adhere to the fabric which comes in contact with it. These bronze paints can be purchased in several size containers. The bronze powder and the bronzing liquid or vehicle are generally in separate compartments in the container and are mixed as required.

The surface of metals can be attractively enriched by ornamenting the surface with indentions produced by marking with a hammer and then applying a protective coating. This process is called hammer-marking. A piece of railroad rail, anvil, or some other heavy metallic surface should be available on which to do the hammering. When it is desirable to hammer-mark the opposite side or edge of the hammered surface, a piece of lead should be placed beneath the finished surface for its protection. Hammer-marking should be done and the surfaces thoroughly cleaned before any holes are drilled, accurate layouts made,

Bill of Materials:

1. 1 pc. 3/32" x ¾" x 3½", 1 pc. 3/32" x ½" x 13¾".
2. 6 pcs. 1/16" x ⅜" x 4½", 1 pc. 3/32" x ½" x 14", 1 pc. 3/32" x ½" x 3½".
3. 1 pc. 3/32" x ¾" x 3½", 1 pc. 3/32" x ½" x 14".
4. 1 pc. 1/16" x ⅜" x 12", 1 pc. 1/16" x ⅜" x 11", 1 pc. 1/16" x ⅜" x 9".
5. 1 pc. 3/32" x ¾" x 5", 1 pc. 3/16" x ½" x 13½", 7 pcs. 1/16" x ⅜" x 1⅜".
6. 1 pc. ⅛" x 5/16" x 14", 1 pc. ⅛" x 5/16" x 9½".
7. 1 pc. ⅛" x 1" x 6", 6 pc. 3/16" wire, 7" long.
8. 1 pc. 3/32" x ½" x 13½", 2 pcs. 1/16" x ⅜" x 7½".
9. 1 pc. 3/32" x ½" x 10", 1 pc. 3/32" x ¾" x 3½".
10. 1 pc. 3/16" x ½" x 14".
11. 4 pcs. ⅛" x 5/16" x 4", 1 pc. ⅛" x ¾" x 8½".
12. 1 pc. 1/16" x ½" x 9".
13. 1 pc. 1/16" x ½" x 9½".
14. 1 pc. 1/16" x ¾" x 11".
15. 1 pc. 3/32" x ½" x 21", 1 pc. 3/32" x ¾" x 3½".



or the parts shaped because the metal stretches when it is hammer-marked.

When the round end of a machinist's ball peen hammer is used for hammer-marking, the process is called peening and the metal is said to be peened. Depending on the individual and the effect desired the round dents produced by the hammer may be close together, overlapping in places, and struck with uniform blows to a uniform depth; or they may be struck with different weight blows to varied depths. Likewise, when only one surface is decorated, the markings may or may not be visible at the edges. *Rack 9* is finished by peening with a protective coating of transparent lacquer applied. Other transparent finishes are obtained by using banana oil, shellac, varnish, linseed oil, or ordinary floor and furniture wax. Linseed oil and wax are the easiest to apply, but they are the least durable.

Another antique effect is produced in finishing *Rack 10.* It is peened, painted with black enamel, sanded lightly when dry so that the high portions of the metal become bright and the low portions remain black. A protective coat of varnish is then applied.

A peened surface may be coated with an opaque finish. Blue enamel was used to finish *Rack 11.*

The process of hammer-marking the metal by striking it with the peen end of a cross peen or straight peen hammer so that the markings are made across the piece of metal is called cross-peening. *Rack 12* is marked with a cross peen hammer. A coat of linseed oil is applied to the rack and then held over a flame until the oil burns, turning the surface black. The surface is then sanded to brighten the high spots and a protective coat of varnish applied. Markings quite similar to those produced by a cross peen hammer can be made with the edge of the face of an ordinary hammer.

Metal finished by heating it over a flame to draw the temper colors to the surface is sometimes spoken of as an oxidized finish. *Rack 14* is finished in this manner. The surface is first cleaned and then heated over a clean flame until the desired colors appear. The metal or the project can be heated in several places to draw out the colors. A transparent coating should be applied.

Interesting designs can be produced on metal by using different shaped punches and chisels struck with a hammer. *Rack 13* is finished by making diamond-shaped designs with an ordinary center punch, plus a transparent protective coat. These punches and chisels can be purchased or most of them can be made in the shop. Commercially they are referred to as dies, punches, chasing, repousse, and background tools.

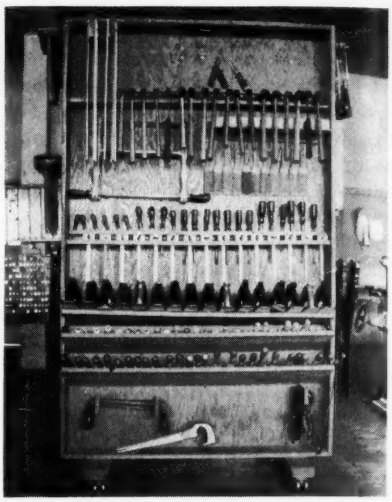
Any one of the hammer-marked surfaces can be finished by any of the finishes described in their connection. For example, a piece of metal decorated by cross-peening could have a transparent finish, an opaque finish, an oxidized finish, etc. applied to it; or as mentioned earlier in the article, a pleasing effect can be had by adding bronzing powders onto a transparent finish.

A cheap smoked protective finish, not desirable for tie racks, used by the old-time blacksmith was produced by covering the surface of the metal with oil and then holding the metal over the forge fire until the oil ignited, thereby producing an oily black temporary surface.

Rack 15 is finished with a "wrinkle" finish which is brought about by using a special paint that can be purchased from the leading paint concerns and is available in several colors. Examples of this finish can be seen on typewriters, lamps, auto heaters and radios, electrical appliances, etc. Specifications furnished by the manufacturers differ, but generally speaking the finish is allowed to air dry fifteen minutes to an hour and one-half, and is then baked from half an hour to two hours in temperatures varying from 200°F to 325°F. Heating causes the paint to wrinkle. To bake or heat the finish the writer mounted an ordinary kerosene stove oven which had a heat indicator over a soldering furnace. The results were very satisfactory. An electric plate also serves well in producing the necessary heat. The finish is unusual, well liked by the boys, covers small defects in the work, and is easy to apply; only one coat is necessary, and it does not cost much more than ordinary enamel.

Several additional unique finishes can be produced in shops equipped with a spray gun. For example, spraying a light mist coat of opaque finishing material in spots on a different colored opaque surface.

Metal or general shop teachers would find it very helpful to make a display panel, or have the advanced students make it, showing the various metal finishes. This could be accomplished by mounting pieces of strap metal ¾" wide and 6" long representing the different finishes on a panel. The samples of the finishes could be numbered with correspondingly numbered instructional material so that the student could select the desired finish and find in the files correspondingly numbered instruction sheets on how to produce it.



Movable Tool Rack

BY ***John M. Norton***
COLLINSVILLE, ILL., HIGH SCHOOL

THE time element is very important in every shop class. Collinsville Township High School has 60-minute periods. When tools were checked out at the beginning of the class and checked in at the end of the period, 10 minutes or 16⅔ percent of the period was wasted.

Our movable tool rack saves time and has solved other shop problems too. It is easily moved to any part of the shop, making tools accessible to every bench. The instructor can check the tools at a glance. Broken tools are easily spotted.

The rack is constructed of a 4 x 6 sheet of ½" plywood with a 1 x 12 yellow-pine frame around it. It has two 2 x 4 feet with four large casters. The rack should be built so it can be moved into a storage-room and locked up when not in use.

The tools are arranged so there is no danger of injuries when they are removed or placed on the rack. The tools used most are placed so that they are the easiest to reach.

We have used this rack for five years and have a daily average of 110 boys in the shop. They all like this rack method better than our old toolroom system of checking tools. This rack eliminates a toolroom man, a job no boy wants. It also does away with substituting one tool for the work of another such as using a chisel for a screwdriver.

The State Department of Safety took moving pictures of this rack in use to show its advantages to other schools.

One-Piece Gavel

by **Stan Schirmacher**
COTTONWOOD, ARIZ., SCHOOLS

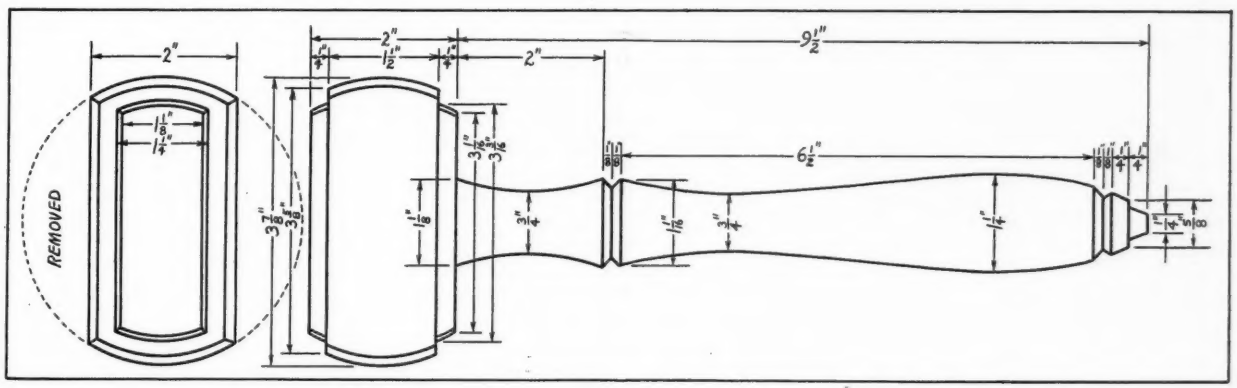
THIS interesting gavel, made in one solid piece of select hard maple from a bowling pin, has proved to be a popular project, for it utilizes a novel source of material and involves handwork in addition to lathe turning.

The alleys either give the pins away or sell them for 5 or 10 cents apiece. (The proper rebounding qualities of the pins are lost when the outer half inch becomes battered, and they are discarded as no longer of bowling value although the center wood remains perfect.)

The bases of the pins have a hole in them which lends itself to the 60° dead center, but the top must be drilled slightly to accommodate the point of a spur center. The gavel is first turned on the lathe, giving it a wheel shaped head. The next step is to remove two sections of the "wheel" with a hand saw. These cuts should be made in line with the grain, and the surfaces are rounded by hand or on the sander to the same curve as on the ends of the head.

Two rabbets are then cut on each side with a hand saw or bench saw to correspond with the notches on the ends of the head. (The angular cut which is in line with the curve of the handle has to be cut with a turning or hack saw.)

After sanding, the gavel is finished with one coat of shellac and several of clear varnish or brushing lacquer.

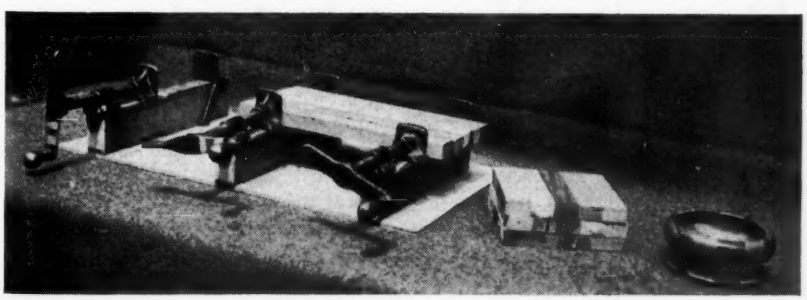


A Laminated Mint Tray

BY *J. S. Turnbull*, JAMES MONROE JUNIOR HIGH SCHOOL, SEATTLE, WASHINGTON

LAMINATED mint trays may be made easily by screwing a piece of plywood to the bottom edge of three short wooden bar clamps, as shown in the picture. This makes it possible for the inexperienced boy to glue up several pieces of wood without getting a wind in the final board.

Cut up short lengths of waste boards with a sharp circular saw, so that they may be glued without joining the edges. These pieces are cut, generally, a little under 1¼" in width and 18" long. With five of these pieces glued up, they make a board ¾" x 6" x 18". The boys can plane both sides smooth and then cut the board in three equal parts. Lay the three pieces on top of each other and glue into a square block, having the grain of the middle layer running opposite to the top and bottom layers.



To use up the shorter pieces of scrap wood, one may glue up three boards from pieces 12" long, as shown in the picture, and make two mint trays.

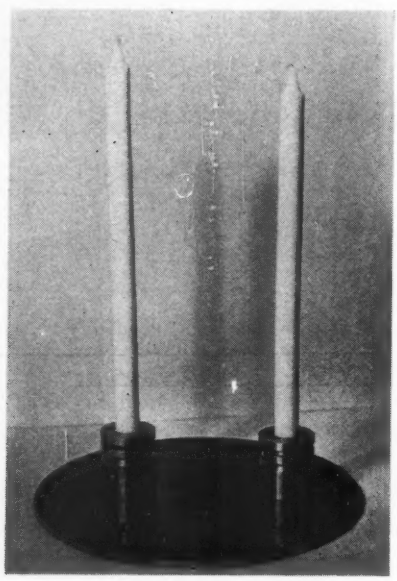
There are several reasons for making laminated mint trays in this manner:

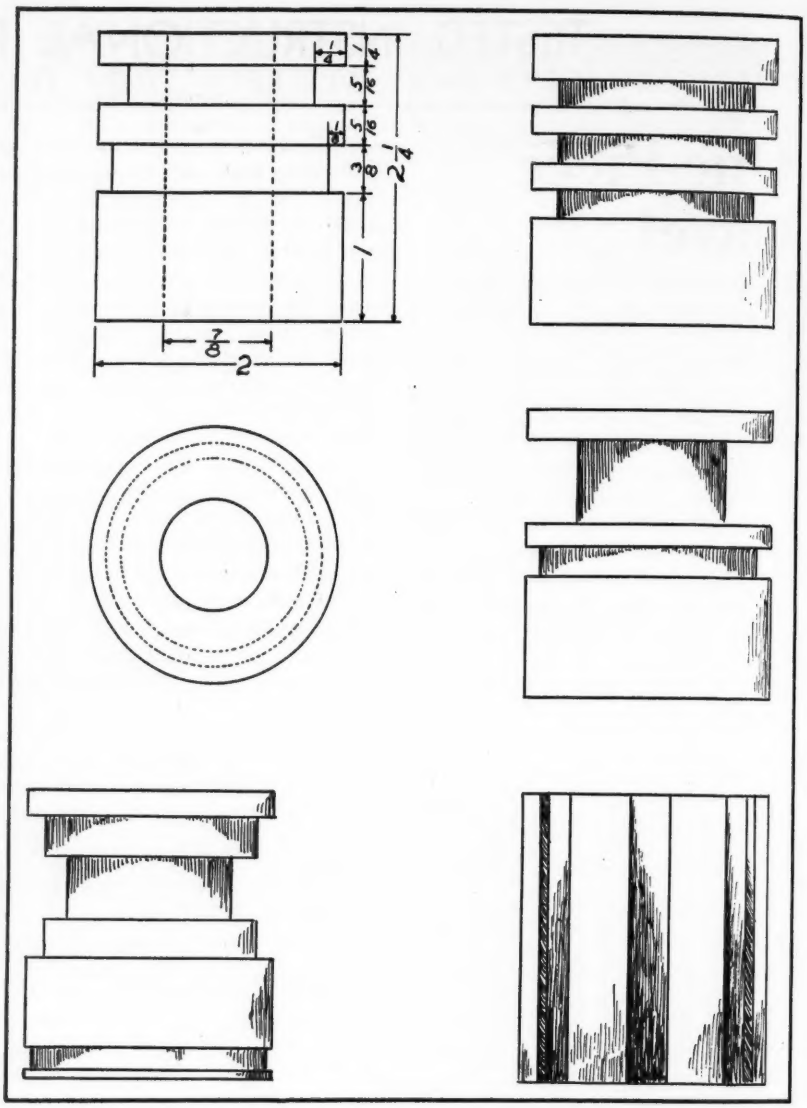
1. They are more appealing to the boys than those made of a solid block.
2. They are much easier to turn, for it is not nearly as difficult to get the end grain smooth.
3. It gives the boys a lesson in joinery.
4. Scrap pieces may be cut up and used that might not otherwise be utilized.

Modern Candlesticks

by **John L. Feirer**

This machine-shop project has the distinction of having craft value as well as offering opportunities for teaching the fundamentals of drilling, boring, reaming, and turning. John L. Feirer teaches at Western Michigan College of Education, Kalamazoo.





MODERN candlesticks of the type shown in Figure 1 make an excellent project in machine shop. It is difficult to find machine-shop projects in which the fundamentals of drilling, boring, reaming, and turning on a mandrel are involved without using a gear blank exercise or a pulley. This set of candle holders involves these same processes with results that are both attractive and useful. A desirable feature of this lathe project is that almost any size of stock can be used. The only standard dimension is the 7/8" center hole. A wide variety of designs can be used and each set will be individual and distinctive in appearance.

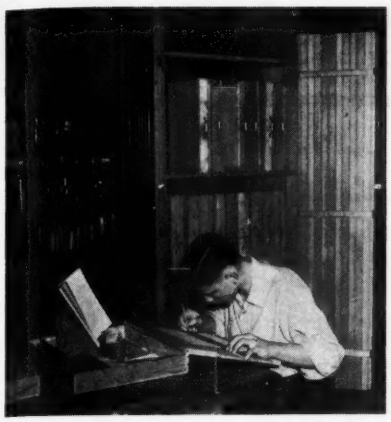
Procedure:

1. Select or develop the design of the candlesticks.
2. Select mild steel or cold rolled stock about 1/8" over finished diameter.
3. Cut off two pieces 1/8" longer than the finished height.
4. Place stock in three-jaw universal chuck and face one end.
5. Place 60° countersink drill in a Jacobs chuck in tail stock and spot the center.
6. Drill 3/16" pilot hole through stock.
7. Enlarge hole to 1/32" under finished size with drill (27/32").
8. Bore hole to 1/64" under finished size (55/64").
9. Ream hole to finished size (7/8").
10. Press stock on mandrel and place between lathe centers.
11. Turn outside diameter to 1/64" over finished size.
12. Face ends of stock to finish height.
13. Finish turning the outside diameter.
14. Cut grooves in correct position.
15. File and polish to desired finish.
16. Remove finished holder from mandrel.

Drawing-Board Kit

BY *T. D. Gard*
FAIRBURY, NEBR., SCHOOLS

WHEN our industrial arts shop was built, no room was set aside for drafting. The author has tried several plans over a period of years as the interest in mechanical drawing has increased. Finally it was decided to use the woodworking shop for the drawing classes. To facilitate storage of the drafting equipment, the author designed the drawing-board kit described herewith. The kit was made 3" x 15" x 20" so that 60 of them could be stored compactly. A storage cupboard was built-in near the shop entrance, so that each pupil may get his kit as he enters and put it away

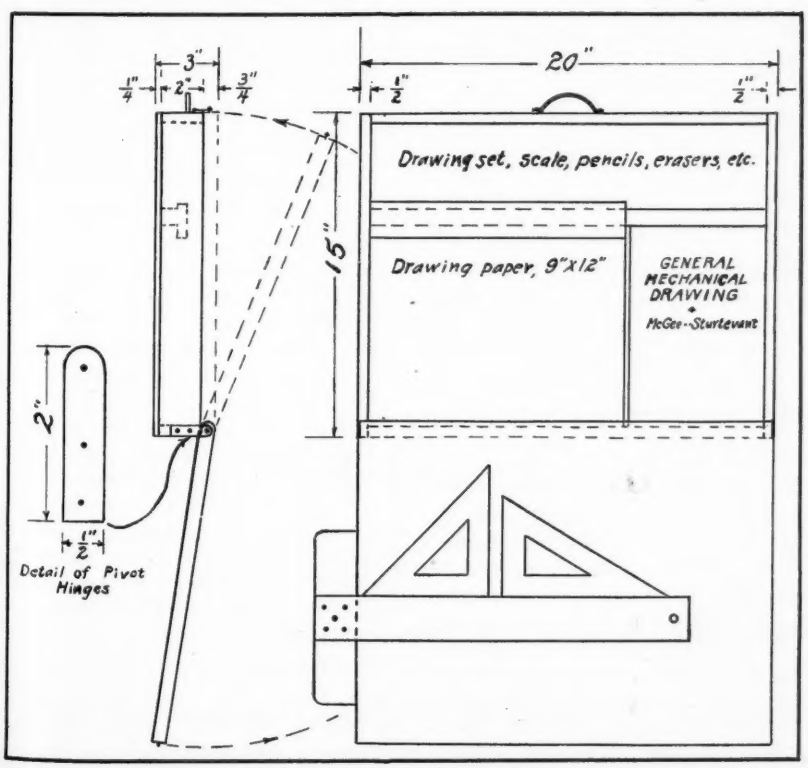


as he leaves. The cupboard is partitioned in two sections, so that 30 kits may be stored in each section. In addition to the convenience in storing between class periods, many pupils find them convenient to carry home when necessary.

To construct: (1) Using 2-d cement-coated nails, nail the ½" x 2" x 15" ends to the ½" x 2" x 19" sides. (2) Nail a piece of ¼" x 15" x 20" fir plywood on the back. (3) Simple pivot-type hinges are made of heavy galvanized sheet metal, and set in flush with the edges of the box and drawing-board, in order to allow the head of the T-square to slide without obstruction. (4) The edge of the drawing-board must be rounded, so that it will open completely. A little experimentation will indicate the most satisfactory position for the hinge strips, which are also applied with the 2-d cement-coated nails. (5) A grooved pine strip is nailed in place as a paper-holder. The textbook and other equipment may be provided with holders, to meet individual desires. (6) An inexpensive wire drawer-pull is screwed in place for carrying, and a flat brass hook is added to hold the kit shut.

In use, the drawing-board (or lid) is opened clear back, as shown. The drawing paper is squared-up on the board so that it is on the inside when the kit is closed. Thumb-tacks are used to hold the upper corners, but the lower corners are fastened down with drafting tape to allow for free passage of the T-square. Thus it is possible to keep a sheet of paper in position from day to day, until the drawing has been completed. The T-square, triangles, scale, and all other drafting equipment are placed inside the kit when not in use. When in the open position, two of these kits may be placed on a standard-sized double woodworking bench. Stools used by the drafting pupils are stored under the work benches during shop periods.

These kits have proved quite satisfactory and are popular with the pupils. They are also used by the author's class in junior college drafting. Several boys have made kits for themselves as shop projects.



CASCO
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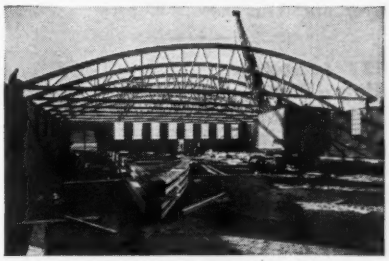

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MAIL COUPON TOGETHER WITH AN OFFICIAL SCHOOL LETTERHEAD

. . . news from INDUSTRY

For items listed in this column, readers may address the firm named or write to News from Industry Dept., SCHOOL SHOP, Box 100, Ann Arbor, Michigan.

ATF Introduces Alpha-Blox

The printing teacher will be interested in a new type creation by American Type Founders, Elizabeth, N. J. Known as "Alpha-Blox," the new type consists of a series of types on the surfaces of which are a variety of straight sections, curves, L's, and T's. Set in block building fashion, these types can be formed into letters of varying design—sanserif, block, curved serif, etc.

The types are made in three sizes, 12, 24, and 36 point, and in linear and reverse styles (see specimen). These two styles are cut and cast to register so they may be used together or for two-color work.

The variety of type styles and designs that the printer can evolve from "Alpha-Blox" is unlimited. In addition, he can use the types for ornaments and "reverse" plates, thereby obviating the use of engravings, etc. A folder with complete showings of "Alpha-Blox" in use will be supplied from any branch of American Type Founders or from SCHOOL SHOP.

Plomb Tool Doubles Output

Sales volume for 1941 double that for 1940 is reported by Plomb Tool Co., Los Angeles, Calif., in a preliminary financial report issued by Dillon Stevens, chairman of the board. Mr. Stevens pointed out that this was for the parent company only, including operations of the Los Angeles and Chicago plants, but exclusive of subsidiaries. Production for 1942 is expected to be four times that of 1941.

Disston Book Gives Tips for Tool Users

School shop teachers will find much of interest to themselves and their students in the *Disston Saw, Tool and File Manual,* published by Henry Disston and Sons, Inc., Philadelphia, Pa.

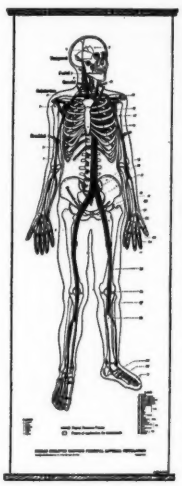
The 48-page booklet gives detailed information on how to choose and use all sorts of hand saws, both for straight cutting and for cabinet, dovetail, and other special purposes. Circular and hack saws are also discussed. Proper sharpening of all types of saws is explained in text and picture.

In addition, many suggestions are given on the use and care of other tools such as scrapers, bevels, files, gauges, trowels, etc.

Copies may be obtained from the company or from SCHOOL SHOP.

Power King Publishes 1942 Catalog

Publication of its new 1942 catalog marks the twenty-fifth anniversary of Power King Tool Corp., Warsaw, Ind. The catalog describes the complete Power King line of power woodworking machinery, including lathes, shapers, band and circular saws, scroll saws, sanders, jointers, grinders, drill presses, and motors. Copies may be had from the Power King Tool Corp. or from SCHOOL SHOP.



Clay-Adams Co. Issues New First-Aid Chart

Of assistance in first-aid work is the *Pressure and Tourniquet Chart* just published by the Clay-Adams Company, New York, N. Y. All digital pressure and tourniquet application points are indicated on an outline in red of the arterial circulatory system. The chart, on cloth-backed stock and reinforced with wood at the top and bottom, is 18 by 54 inches in size, and is easily visible from all parts of the classroom.

WHAT'S DOING IN THE FIELD

news

OF INDUSTRIAL EDUCATION

MARCH saw publication of volume one, number one, of the West Virginia *Vocational Education News,* which is published monthly by the West Virginia branch of the American Vocational Association in cooperation with the Division of Vocational Education of the State Department of Education.

The new magazine is edited by members of the association and its adviser is Dr. W. W. Trent, state superintendent of free schools and state director of vocational education.

Now housing the new Pennsylvania School for Aeronautics at Hershey is the Farm Show Building which formerly contained one of America's finest agricultural exhibits. Conversion of the building will provide approximately 290,000 square feet of floor space, particularly well adapted to occupational training. Classroom facilities, cafeteria, office space, parking area, and well-lighted shop area are available. Operating on a two-shift basis, the building is expected to accommodate 4,000 students per day, of whom many will be women.

Training will be in essential aircraft maintenance operations such as engines, sheet metal, electricity, instruments, welding, parachutes, etc. Intensive courses in related technical subjects will also be given. This training is expected to be sufficient for the trainee to take up, on completion, full-time work at the Middletown Air Depot and affiliated substations.

ADDRESSING a symposium of school superintendents and board members at the Henry Hudson Hotel, New York, in January, Dr. J. C. WRIGHT, assistant U. S. Commissioner for Vocational Education, emphasized the importance of planning for the postwar period of vocational training. Dr. Wright stated that the vocational schools must prepare to meet training demands necessary to train workers to produce peacetime goods in quantity to keep the national income at $100,000,000,000 per year, which level will be reached in 1944. The schools will have to cope, he said, with the demobilization not only of the armed forces, but of the war-production industry that cannot be maintained in peacetime.

IN THE Morning Mail...

[Brief comments about SCHOOL SHOP *and the field it serves are invited. Address the Editor,* SCHOOL SHOP, *Ann Arbor, Michigan.*

Gentlemen:

Thanks for the magazine SCHOOL SHOP. I like it.

However, I think "safety" should be one of your watchwords and in this respect, I call your attention to the centering jig on page 11 of the March issue. My comment is that the live center has three adjusting screws extended beyond the housing. This constitutes a real hazard to the operator.

I suggest increasing the wall of the housing or cup from ¼" to ⅝" and using headless set screws flush or below the surface. They would be a bit unhandy, no doubt, but not so unhandy as a mangled hand or arm.

PAUL C. HOOPES
Manual Arts Department
Clark High School, Roselle, N. J.

[Reader HOOPES' point is well taken. It must always be borne in mind, however, that to eliminate all accident hazards from the school shop would eliminate the shop itself, but that intelligent caution can prevent accidents. It is good to know that SCHOOL SHOP's projects are adapted to individual uses, and that its readers are attentive to matters of safety in their shops.—*Ed.*]

Gentlemen:

SCHOOL SHOP has been a happy surprise since receiving your first copy dated October, 1941.

So far, I have hesitated to put it on our magazine board where we clamp by a metal strip and bolts other magazines, because boys sometimes tear literature and I want my copies intact.

W. P. WATTS
Oroville Union High School
Oroville, Calif.

Gentlemen:

I was interested in the article by F. N. Newton, Jr., in your March issue, regarding the use of plastic material.

Hand in hand with his use of plastics to make models should go the use of this material to make projection boxes. I have found that the use of such projection boxes quickly overcomes many difficulties in teaching blueprint reading in defense classes. Procurable at most stationery stores are the Blaisdell "Cellophane" pencils, in black, red, and blue. These write easily on plastic materials and erase with a dry cloth. With the three colors, it is possible to emphasize many technics otherwise impossible to put across.

Another use for these pencils which I have experimented with is the making of slides. All that is necessary is to have clear glass slides of the correct size for the projector. Sketches or any other material for any school subject can be prepared almost "on the spot"; they can be changed or revised easily; or they can be erased and the same glass slide used over and over again.

I am certainly enjoying SCHOOL SHOP.

IRA M. HOLMES
Munger Junior Trade School
Detroit, Mich.

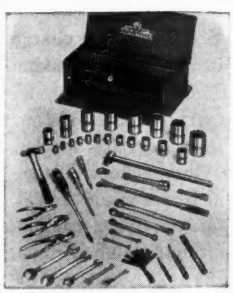
Gentlemen:

When seeking industrial arts instructors, I would first consider personality. The applicant should be vigorous, neat, cheerful, and well-balanced. Then I would consider his training. He should have a well-rounded education with very definite leanings toward technical and industrial courses. He should be well grounded in the fundamentals of a variety of industrial subjects with more intensive training in one or two of them.

I would hope to find in him some background of experience in trade or industry. This experience would make him more effective in teaching subjects related to this experience, more sympathetic to the problems of industrial employment and management, and more capable of advising boys with regard to their entrance into occupations in the fields of industry.

CHARLES T. MILLER
Supervisor, Industrial Arts
Tacoma, Wash., Public Schools

[Mr. MILLER was to have been among those answering the question of the month for April. Since his letter arrived too late for inclusion in that issue, we print it here.—*Ed.*]



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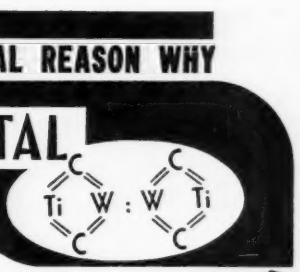

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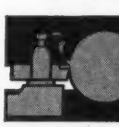

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What Do You Think?

Should state-supported residential schools for vocational education be established generally for pupils in smaller communities where local schools cannot afford to provide vocational training?

▸ Says ROY A. BARTHOLOMEW, Director of Industrial Arts, Public Schools, Iowa City, Iowa:

No, except as a war expedient. The system proposed would only give us a little more of the same type of vocational education which we have now.

The question should be met by federally supported residential schools established on a broad regional basis. It should be a comprehensive system so complete that it will gradually replace all the vocational training in the secondary schools. Such schools should be established for all trades—baker, barber, butcher, beauty operator, not just the limited number which could be supported by some small city. Public schools could prepare students for this larger type of vocational school with the same care and attention which they now give to preparation for university work.

There should be entrance requirements based on age and experience or high-school preparation. There should be graded licenses and diplomas from these schools, diplomas which the graduates would display with the same pride and confidence as that of the doctor who hangs his diploma in his office.

▸ Says GUY O. TOLLERUD, Supervisor, National Defense Training, Austin, Minnesota:

Because of the capital outlay required in building and equipment and because vocational education must cover a broad field and not be confined to training in a few of the basic trades, it does not seem feasible for small local communities to attempt the establishment of trade schools. Furthermore, vocational education must be conducted on such a high standard of training and its classes taught by such well qualified and skilled instructors that it serves not only as a primary training institution, but also in the capacity of a supplementary training institution for the adults at work in industry.

To achieve such success and rank, vocational schools must be supported largely through state and federal funds and be placed in such strategic localities as to serve large areas in the form of residential vocational schools of outstanding merit.

▸ Says FOREST E. MOORE, Director of Vocational Education, State Board for Vocational Education, Des Moines, Iowa:

Perhaps one of the most important undeveloped fields in our vocational education system is the area or district vocational school. Among other things such schools should be organized to serve youth in rural and smaller communities which are now without adequate vocational training facilities, especially for nonagricultural occupations. Such area or district schools should be supported from state and federal funds since most rural communities cannot afford to maintain training facilities equivalent to those in larger urban centers. Area or district schools should be within reasonable commuting distance of students to be served and in some instances they could be organized on a residential basis. Preferably the schools should provide training for youth of a post-high-school age. However, provisions should be included in the curriculum offering training for older youth who may not have completed their high-school education.

▸ Says ALBION S. TAYLOR, Director of Industrial Arts, Monroe, Michigan, Public Schools:

State-supported residential schools for vocational training would be a fine answer to the problem of vocational training in the small community. I think that the general public would allow the establishment of "State Industries" for training purposes in order that the vocational experience of the training program might be real, rather than the simulated type of vocational experience so general in the present vocational training program. The situation is a challenge to our leadership.

Strictly Personal...

ABOUT YOUR FELLOW TEACHERS

N. S. GARDNER, formerly of Crownpoint, N.M., has been transferred to the Neopit Day School of the Keshena Indian Agency at Neopit, Wis. . . . JOHN F. KAGAY has replaced H. W. LEHNING as industrial arts teacher at Champion Junior High School, Painesville, Ohio. . . . New to the ranks of industrial arts teachers is WAYNE A. BARR, who has taken a position at Chaffey Union High School, Ontario, Calif., upon graduation from San Jose State College. . . New principal of the Wyoming National Defense School, Laramie, is W. O. LEMON, who taught formerly at Boise, Idaho, High School. WILBUR LEONARD is taking LEMON's place at Boise. . . . Dr. WILLIAM J. MICHEELS, formerly of the University of Minnesota College of Education, is now a teacher trainer at the Armored Force School, Fort Knox, Kentucky. Lt. Col. VERNE C. FRYKLUND, in charge of the school, was previously head of the Industrial Education Department at the same university. . . . Recently added to the University of Minnesota staff in industrial education is CLARENCE CHRISTOPHERSON. . . . ELDON ROBBINS, formerly of the Michigan Education Association, is now in charge of visual education for the Michigan State Board for Control of Vocational Education. . . . EDWIN LOGAN, for four and a half years industrial arts teacher at Mentor Village, Ohio, school, has accepted a position at Brush High School, South Euclid, Ohio. . . . Now teaching shop at Lincoln Junior High School, Pontiac, Mich., is EVERETT MEYER, formerly of Vassar, Mich., High School. . . . The death was recently announced of ERWIN L. MILES, principal of Honolulu, T.H., Vocational School.

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instructional resources

Inquiries concerning materials described in these columns may be addressed to SCHOOL SHOP, Box 100, Ann Arbor, Mich., and will be passed on to the proper firm or person.

Books . . .

Modern Homecraft. Raeth. Chicago: Frederick J. Drake & Co., 1941. Pp. 240. $3.00.

Twenty-eight modern woodworking projects—pieces of furniture for the home—complete with working drawings, pictures, bill of materials, and steps in construction. In addition a chapter on wood finishing; index.

George A. Raeth is the author of *Master Homecraft Projects* and past president of the art and industrial arts section of the Colorado State Teachers Association and of the mechanical arts section, Utah State Teachers Association.

Building Insulation. P. D. Close. Chicago: American Technical Society, 1941. Pp. 328. $3.00.

A book on the principles and application of sound and heat insulation of buildings. The greater part of the book, of course, concerns itself with heat insulation. In this part of the book are chapters on thermal building insulations, methods of application, fundamentals of heat transfer, transmission coefficients, and other chapters on various phases of insulation.

Chapters on sound insulation include material on machinery isolation and architectural acoustics and noise quieting. Illustrated with photographs, diagrams, drawings. Copious tables and charts, including a list of commercial insulating materials, their descriptions, and their manufacturers. Index.

Paul Dunham Close, B.S., is technical secretary of the Insulation Board Institute, and formerly technical secretary of the American Society of Heating and Ventilating Engineers.

Applied Science. Banks. New York: John Wiley & Sons, Inc., 1942. Pp. viii + 212. $1.75.

An overview of science as applied to industrial operations and trades. Dealing with the fundamental principles of physics, mechanics, strength of materials, heat, light, etc., the author has intentionally condensed his material into brief scope to come within the range of the average student. Relatively few and simple mathematical processes are involved and the text is further clarified by drawings and problems with the solutions worked out. Each section of each chapter has questions for testing the student's comprehension. Chapter on reference data, tables, formulas; index.

Charles W. Banks, C.E., is head of the department of applied science at Wentworth Institute, Boston, Mass.

Industrial Electricity, Part II. Dawes. New York: McGraw-Hill Book Co., 1942. Pp. xvii + 521. $2.75.

The object of this text is to develop simply the principles of alternating current and to show its applications to electrical apparatus and machines. Discussed are: alternating current and voltage; single-phase alternating circuits; AC instruments and measurements; transmission and distribution; vacuum tubes and much other material. Appendices of related information; questions and problems; index.

Chester L. Dawes, S.B., is associate professor of electrical engineering, Harvard University.

Modern Adhesives and How To Use Them. Gloucester: LePage's, Inc., 1942. Pp. 20.

A practical discussion of the use of liquid, animal, casein, and resin glues. Related material is also given on the manufacture of glues which should be of interest to the student. A section is also devoted to general instructions on gluing. Address: LePage's, Inc., Gloucester, Mass., or SCHOOL SHOP.

Bibliography . . .

The General Shop. Charleston, Ill.: Iota Chapter, Epsilon Pi Tau, Eastern Illinois State Teachers College, 1941. Pp. 13.

An annotated bibliography of articles describing various phases of general shop organization and operation. Articles are listed alphabetically by authors and annotated by members of the chapter.

Films . . .

Aviation Metalsmithing. Detroit: The Jam Handy Organization, 1942. $3.50 each.

Five slidefilms on aviation metalsmithing: repairing sheetmetal surfaces; properties of metals (two parts); protection of metals (two parts).

Price Reduced for 'Woodworking Workbook'

Manual Arts Press, Peoria, Ill., announces a price reduction for its *Woodworking Workbook*, by Nichols and Stiles (see SCHOOL SHOP, March 1942, page 24). The new price is 56 cents, a reduction of 12 cents from the former price.

Greenwood Company Publishes Training Books

The Greenwood Company, Albany, N.Y., is the printer of the series of suggested unit courses in various phases of defense-training prepared by the State Education Department of New York. Orders for these books should go directly to the Greenwood Company, 49 Sheridan Ave., Albany.

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Washington Letter

STUDENTS' eyes must be turned toward the skies! Plans and suggestions are coming thick and fast from Washington for making the modern youth as air-minded as he now is automobile-minded. The Civil Aeronautics Administration, the Army Air Corps, the Bureau of Aeronautics of the Navy, and the U. S. Office of Education have plans galore, some of which have already jelled as witness the enthusiasm for the making of scale models of Allied and Axis airplanes cosponsored by the Navy and the Office of Education.

▼ The latest development is a suggestion by John W. Studebaker, U. S. Commissioner of Education, that the nation's high schools be used by both in-school and out-of-school youth for instruction on a voluntary basis designed particularly to equip youth for future service in the Air Corps. The program would be carried out in any high school in which 15 or more prospective air cadets can be enrolled. The Commissioner wants no time lost and suggests that training begin immediately, either as an extra subject or before or after school hours. He also advocates summer school programs of training tuition free with boys from nearby communities allowed to attend. For next semester, he advocates a full semester's work in aeronautics so that boys later entering air cadet training would have more time for flying.

▼ Lest the impression be gained that a number of federal agencies are working at cross purposes and without coordination, it should be pointed out that a national joint advisory committee is already functioning to secure cooperation between the above-mentioned agencies and to avoid duplication of purposes and operating procedures. The committee is not only interested in the promotion of aviation education for the war effort but also to prepare for the tremendous postwar expansion that is in store for civil aviation. The U. S. Office of Education has prepared a basic course in aviation education which is now being taught in the District of Columbia Schools. [For indication that not all interest in aviation centers in Washington, readers are referred to pages 2-6 of this issue.—*Editor.*]

▼ Aviation is not alone in the minds of Washingtonians who are concerned with trained personnel. Radio is another field where the schools are scheduled to lend a helping hand. A total of 50,000 trained radio technicians is wanted by the Signal Corps by the end of the year. Most of them will come directly from the wartime training program financed by the government.

▼ The future of the NYA and the CCC is still controversial at this writing. After more than two weeks of hearings before the Senate Committee on Education and Labor, Senator McKellar of Tennessee offered amendments to his bill (S. 2295) introduced February 23 which provided for termination of the two agencies at the end of 1942. The amendments would make the NYA strictly a war baby. An appropriation of twenty million dollars would be made for certain activities of the NYA vocational training projects which "shall be continued only for the purpose of training men to serve as mechanics, artisans, and machinists for the Army, Navy, and Air Corps or in industries essential to the prosecution of the war." Training would be furnished only to men in such numbers as may be recommended by the Army, Navy, and Air Corps. The financial aid program for youth in schools or colleges and out-of-school youth is definitely out of the Senator's bill. The CCC is likewise made a war baby with another twenty million appropriated to transfer on or before July 1, 1942, to the Forest Service any CCC camps in operation December 1, 1941, in any of the following states: California, Oregon, Washington, Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona, and New Mexico. Purpose: to afford protection against forest fires and sabotage. Yet another twenty million dollars is appropriated under the terms of the amendment to provide for the transfer to the U. S. Office of Education of such CCC personnel and equipment as are deemed necessary to administer "functions relating to vocational education and training" in those CCC camps located at or near military establishments as may be requested by the Secretary of War. Any transfer of NYA activities to the Office of Education must be designated by the Federal Security Administrator with the approval of the War Production Board. Hearings at which the agencies took great pains to justify their existence have been suspended at this writing. They are to be continued later. Final action on the bill is a matter of conjecture. The administration is opposed to McKellar's bill and Sidney Hillman appeared at the hearings in favor of retention of the agencies. At that time he advocated consolidation of all federal defense-training agencies.

▼ The U. S. Chamber of Commerce has joined hands with the American Association of School Administrators in calling on local schools to expedite and expand the wartime training program. A handbook has been issued and a central agency has been established by the two organizations for clearance of informaton on job-training programs. A call has gone out to city superintendents and chamber of commerce presidents in 1300 communities to put their resources to the task of supplying the 10,000,000 additional workers which will be needed in the coming months by war industries.

The Cover

The young man on the cover of this issue is Ralph Millard, a student at Hirsch High School, Chicago, Illinois. He is making a final inspection of one of the model planes he has made for the Navy. The photograph is courtesy of Dr. Louis V. Newkirk, Director of Practical Arts, Chicago, Illinois, Schools.

Grateful acknowledgment is also made to the *Baltimore Bulletin of Education* for the illustrations used on pages 8 and 10.

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